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# Table of Contents

	<b><u>Page</u></b>
<i>Statement of Work</i> .....	<i>ii</i>
<b><i>I. Introduction</i></b> .....	<b><i>1</i></b>
A. Nature of the Problem.....	1
B. Background and Previous Work.....	1
C. Purpose of Present Work .....	3
1. <i>Hypotheses</i> .....	3
2. <i>Technical Objectives</i> .....	4
<b><i>II. Body</i></b> .....	<b><i>5</i></b>
A. Methods .....	5
1. <i>Study Setting</i> .....	5
2. <i>Participants</i> .....	5
3. <i>Design</i> .....	5
4. <i>Follow-up Tracking Procedures</i> .....	6
5. <i>Survey Procedures</i> .....	6
6. <i>Description of Interventions</i> .....	8
7. <i>Measures</i> .....	9
8. <i>Analyses</i> .....	10
B. Results.....	10
1. <i>Participation in Intervention and Assessment</i> .....	10
2. <i>Extent of Intervention Delivery</i> .....	12
3. <i>Prevalence of Smoking Among Navy Women Recruits and</i> <i>Comparison with Civilians</i> .....	12
4. <i>Entry-to-Graduation Changes</i> .....	23
5. <i>Smoking Status Among Women 3-Months Post-Graduation</i> .....	35
6. <i>Publications, Presentations &amp; Awards (cumulative)</i> .....	39
<b><i>III. Conclusions/Discussion</i></b> .....	<b><i>41</i></b>
A. Interim Findings .....	41
B. Accomplishments and Challenges .....	42
<b><i>IV. References</i></b> .....	<b><i>44</i></b>
<b><i>V. Appendices</i></b> .....	<b><i>48</i></b>

## Statement of Work

### Year 2:

#### Goals:

Complete data collection at the RTC; continue post-RTC intervention efforts; continue post-RTC follow-up data collection.

#### Tasks:

- A) Complete recruit training *entry* data collection. [month 3]

**Completed. RTC entry data collection was completed March, 1997.**

- B) Complete recruit training *graduation* data collection. [month 5]

**Completed. RTC graduation data collection was completed May, 1997.**

- C) End introduction of 1-888-helpline to selected companies at the RTC. [month 5]

**Completed. The helpline was introduced to the final division in May, 1997.**

Continue availability of 1-888-helpline and mail support for appropriate groups. [month 6- Year 1 through month 3 and 6 of Year 3 for mail and helpline.]

**Ongoing. Availability of the 1-888-helpline and the mail support for intervention groups is ongoing.**

- E) Complete 3- and 6-month post-RTC follow-up assessments. [months 7 and 10, respectively]

**Completed. 3-month follow-up assessments completed September, 1997; 6-month follow-up assessment will be completed November, 1997.**

- F) Initiate 12-month post-RTC follow-up assessment. [month 5]

**Completed. 12-month follow-up assessment initiated in May, 1997 and is ongoing.**

#### Milestones:

- A) Complete interim report describing progress during second year of the study.

**Completed.**

- B) Report study findings on the prevalence of women smokers at entry into the Navy and changes in self-reported smoking status after eight weeks in the "smoke-free" recruit training environment.

**Completed. See Results in this report.**

- C) Report preliminary findings on the prevalence of smoking relapse at the 3-month follow-up assessment.

**Completed. See Results in this report.**

# **I. Introduction**

## **A. Nature of the Problem**

One of the primary goals of the Defense Women's Health Research Program (DWHRP) is to solve problems faced by servicewomen that will directly improve their safety, health, and military effectiveness. Facilitating nonsmoking among military women clearly fits within this DWHRP goal. Currently, smoking rates remain higher among military personnel than among civilians (Bray, Kroutil & Marsden, 1995; Bray, Kroutil, Wheelless, Marsden, Bailey et al., 1995), underscoring the need for special efforts within the military to reduce this problem. Furthermore, research indicates that women have greater difficulty quitting smoking, and remaining quit, than do men. Thus, gender-specific interventions are needed that are effective in reducing tobacco use specifically among military women.

Tobacco use is an important issue when considering the factors that can influence military effectiveness/readiness. For example, smokers tend to exercise less and perform more poorly on military physical fitness tests (Conway & Cronan, 1992, 1988). This is a particularly important issue as military women prepare to go into job ratings previously unavailable to women, in large part because many of these jobs are very physically demanding. Thus, supporting healthful behaviors, discouraging unhealthful behaviors, and understanding the gender-specific factors that might support or inhibit such behaviors will become an even more important concern as women branch into virtually all domains of military operations.

The Department of Defense has recently become the largest employer in the US to mandate a total smoke-free workplace ban in which smoking is prohibited in virtually all indoor work spaces (DoD, 1994). This ban, although highly laudable from a health and readiness perspective, will place additional burdens (psychological, physiological, and temporal--i.e., time and location constraints for smoking) on military personnel who continue to smoke. Degradation of morale among smokers is also a concern. Consequently, it is to the military's advantage to support efforts that maintain the cessation state that is achieved by all military recruit smokers going through basic training in all four services. Estimating that over 30% of incoming military recruits are smokers, it is clear that the military's smoking prevalence would be dramatically lowered within a decade if a high percentage of incoming recruit smokers could *maintain* the "quit status" organizationally mandated during basic training.

## **B. Background and Previous Work**

Recent civilian trends indicate that the prevalence of smoking and the burden of tobacco-related disease is shifting, as the smoking rates of young adult women are beginning to exceed those of men (Pirie, Murray & Luepker, 1991; Pierce, Fiore, Novotny et al., 1989; USDHHS, 1988; Remington, Forman, Gentry, et al., 1985.) Of particular concern to the DoD, a study comparing substance use in standardized samples of civilians and military personnel concluded that military women are more likely to smoke and to smoke heavier than their civilian counterparts (Bray, Marsden & Peterson, 1991; Bray et al., 1995). Another study reported a 50% smoking rate

among women entering the US Navy compared to a 41% rate for men (Pokorski, 1992). As the numbers and roles of women in the military expand, it is of critical importance to reduce their smoking prevalence and the smoking-related adverse effects on readiness, personal health, medical care costs, and the health of their children.

There have been reductions in military smoking rates in recent years due at least in part to military health promotion efforts, yet increased support for cessation is needed to further reduce smoking rates (Pokorski, 1992). Cessation is a complex behavioral problem for smokers, most of whom experience substantial difficulty quitting (Fiore et al., 1989). In general, however, smokers prefer to quit without intensive intervention. Convenient information and support in the form of telephone hotlines and mailed self-help materials have been shown to be effective (Gruder, Mermelstein, Kirkendol, et al. 1993; Ossip-Klein, Giovino, Megahed, et al. 1991). The issue of cessation is complicated, however, by the fact that women and men may have different cessation experiences. For example, women and men are similar in terms of their intentions to quit and their number of quit attempts, yet women are less likely to succeed in their cessation efforts (Kabat & Wynder, 1987; USDHHS, 1979; Gritz & Jarvik, 1978). Black women in particular have a low propensity to quit (Geronimus, Neider & Bound, 1993). Theoretical and empirically-based explanations for this finding point to gender differences in the following: severity of withdrawal symptoms (Guilford, 1967), confidence and self-efficacy for quitting (Blake, Klepp, Pechacek, et al., 1989), perceived social/psychological benefits of smoking (e.g., stress reduction) (Lacey, Manfredi, Balch, et al. 1993; Grunberg, Winders & Wewers, 1991), media and social influences to smoke (Grunberg, Winders & Wewers, 1991; Ernster, 1985; Howe, 1983), cognitive and emotional reactions to cessation lapses (O'Connell, 1990; Blake, Klepp, Pechacek, et al., 1989), normative biases regarding smoking prevalence (Lacey, Manfredi, Balch, et al., 1993), cessation coping strategies (Sorensen & Pechacek, 1987), occupational status and perceived control at work (Hibbard, 1993), knowledge and concern about the health risks of smoking (Sorensen & Pechacek, 1987; Ernster, 1985) and biological sensitivity to nicotine (Perkins, 1996; Grunberg, Winders & Wewers, 1991).

During cessation attempts, women may rely on informal sources of social support more than men do (Sorensen & Pechacek, 1987.) In addition, studies consistently report that women fear cessation-induced weight gain, and that this concern may contribute to relatively higher relapse among women (Marcus, Albrecht, Niaura, et al. 1991; Perkins, Epstein, & Paster, 1990.) Weight gain may be particularly worrisome for women in the military because their fitness level and weight are routinely tested, and unacceptable levels are grounds for discharge (OPNAVINST 6110.1D, 1990). The findings above suggest that smoking cessation interventions should be gender-specific, and that effective cessation programs should include convenient social support and weight management strategies (e.g., focus on exercise and nutrition) (Marcus, Albrecht, Niaura, et al., 1991; Sorensen & Pechacek, 1987.)

Comprehensive DoD and service-specific policies have been implemented that address the prevention and reduction of smoking by mandating smoke-free work places and cessation support for military personnel (DoD, 1994; SECNAVINST, 1986). The US Navy, for example, prohibits tobacco use during recruit training for the entire eight-week duration of basic training. A recent study by two of the this study's investigators found a meaningful impact of the Navy's

no-smoking policy on the smoking behavior of male recruits at graduation from basic training (40% self-reported quit rate) (Hurtado & Conway, 1996). However, because the 1-year quit rate indicated substantial relapse, the authors recommended cessation education and skills training to help new Navy personnel maintain long-term cessation. An unpublished study by the same investigators of male and female enlisted recruits found that the short-term positive effects of the smoking ban during basic training was more dramatic for women smokers than for men (i.e., a 43% reduction in smoking prevalence for women versus 15% reduction for men). However, women also showed greater relapse at the one-year follow-up (67% increase in smoking for women versus 38% increase for men).

### C. Purpose of Present Work

The primary purpose of this study is to test an innovative approach aimed at reducing tobacco use among Navy women. The study, entitled Operation Stay Quit (OSQ), is designed to implement and evaluate two relatively "nonobtrusive" (i.e., telephone helpline and mail) relapse-prevention strategies supporting maintenance of the organizationally-enforced "quit status" achieved by all recruits during their basic training. In addition to a standard-treatment control group, one intervention group is encouraged to access a toll-free, telephone helpline for support and counseling to remain a nonsmoker or to quit again if they have relapsed into smoking; the other intervention group receives a series of monthly mailings to support and encourage nonsmoking during their first year of naval service.

#### 1. Hypotheses

The investigators' primary hypotheses regarding the smoking rates of Navy women during their first year of service are the following:

- (a) The prevalence of self-reported smoking among women recruits at entry into the Navy will decline significantly by the end of basic training as a result of exposure to the mandatory no-smoking policy and standard tobacco use education received during recruit training. This result has been observed previously in men recruits (Hurtado & Conway, 1996). And, based on a small sample of unpublished data on women by these investigators the percentage change from self-reported smokers to nonsmokers by the end of training is expected to be greater in women than previously reported for men.
- (b) The relative percentages of former smokers who *relapse into smoking* after leaving the Recruit Training Command will be ordered as follows:
  - (i) lowest relapse rate in the women assigned to the condition with access to and encouragement to use the telephone helpline,
  - (ii) intermediate relapse rate in the women assigned to the intervention condition receiving regular mail support, and
  - (iii) highest relapse rate in the standard-treatment group of women who receive no intervention supporting maintenance of smoking cessation after graduating from

recruit training. It is hypothesized that the telephone helpline group will have lower relapse rates than the mail-support group for several reasons. Although everyone in the mail-support group will receive intervention materials, this approach is a *passive* strategy and is, therefore, expected to have a lower impact than the *active* strategy involved in the telephone helpline approach. Also, whereas only a subset of individuals in the helpline group will actually use the phone service, it is expected that this intervention strategy will be very effective for those who do call. In addition, incentives will be offered to encourage use of the helpline.

- (c) "Stage-of-change" patterns of cessation and relapse curves are expected to be different across the groups based on comparisons of the 3-, 6-, and 12-month measures of smoking status after leaving recruit training. The steepest relapse curve post-RTC is expected in the standard-treatment control group. The flattest relapse curve is expected in the group who receives the telephone counseling.
- (d) Considering only the intervention group with access to the telephone helpline after leaving the RTC, women who call the telephone helpline will have a lower smoking relapse rate at the 12-month follow-up than will women who do not use the helpline.

## 2. Technical Objectives

The specific questions to be addressed by the primary technical objectives of this project are as follows:

- (a) After exposure to the RTC's 24-hour-per-day no-smoking policy (i.e., mandatory "cold turkey" cessation for eight weeks) do a significant number of women who smoked when they entered the Navy modify their self-concept as smokers and report that they are *former* smokers at the end of recruit training?
- (b) What percent of women smokers relapse into smoking again after having spent an 8-week period of mandatory cessation? Does this percentage vary by demographic subgroups (e.g., age, education, ethnicity), by psychosocial predictors (e.g., "stage of change" for smoking cessation), or by Navy environmental factors (e.g., ship versus shore command, deployment status, job rating, type of technical training)?
- (c) Are the two cessation-support interventions tested in this study more effective than the Navy's "standard treatment" in preventing smoking relapse after leaving recruit training? What is the relative effectiveness of the telephone helpline support compared to the mailed support in preventing smoking relapse?

## II. Body

### A. Methods

#### 1. Study Setting

All Navy recruits - women and men - receive their basic training at the Recruit Training Command (RTC), Great Lakes, Illinois. The RTC is the setting for recruitment into the study, as well as baseline and graduation assessments of smoking status. All recruits go through an 8-week basic training program as their introduction to the Navy. A 24-hour-per-day ban on smoking is in place for the entire eight weeks of training. Following completion of recruit training, Navy personnel are stationed at commands throughout the world. Intervention materials and surveys are mailed to participants at their current duty station.

#### 2. Participants

Study participants consist of volunteers from among all female recruits entering the Navy between March 1996 and March 1997 (approximately 12 consecutive months). A recruitment period of approximately one year was chosen due to the seasonal variation in the characteristics of recruits. A more detailed description of the participant sample is presented in Section II.B.1.

#### 3. Design

The research is a longitudinal field experiment in which women recruits are randomly assigned to one of three conditions and are followed over five repeated assessments. All women recruits are approached during processing week (P-week) regarding participation in the study. After being given a description of the study, they are asked to give voluntary consent to participate and complete a baseline survey. Just prior to graduation, these recruits are asked to complete a graduation survey to ascertain changes in self-concepts regarding smoking status. All recruits who describe themselves as smokers on the baseline survey comprise the follow-up study group, which is assessed three additional times over the course of one year post-RTC training.

The three study conditions are:

- (a) **control** - standard recruit training information and no other treatment (RT-only),
- (b) **telephone** - standard recruit training plus access post-RTC to a toll-free telephone helpline to support relapse prevention or support for quitting again (RT + phone), and
- (c) **mail** - standard recruit training plus a series of post-RTC regular mailings with incentive items to support relapse prevention and encourage quit attempts (RT + mail).

Because all recruit training activities are conducted as divisions of approximately 80 women, random assignment to condition is made by division rather than individual. Thus, divisions are randomly assigned to one of the three study conditions: (a) RT-only, (b) RT + phone, and (c) RT + mail. Although the unit of randomization is division, the unit of all analyses is the individual. This is appropriate because individuals are essentially randomly assigned to divisions (i.e., in the order they arrive at recruit training).

Smoking relapse typically occurs relatively soon after a quit attempt, therefore several assessments of smoking status are made during the first year post-RTC. It has been estimated that approximately 70% of people relapse within three months of a cessation attempt, with an additional 10-15% relapsing between 3 and 12 months (O'Connell, 1990). Participants are sent a follow-up smoking status survey at 3-, 6-, and 12-months after graduating from recruit training.

#### 4. Follow-up Tracking Procedures

The study has used several Navy data sources to locate and track study participants after graduation from RTC. For the purpose of conducting the 3-month post-graduation smoking survey, the orders-disseminating computer system maintained by Source Data Systems (SDS) at Navy Bureau of Personnel (BUPERS) provided the basis for tracking participating recruits immediately after graduating from recruit training up. SDS electronically sent OSQ staff a weekly file of all women recruits receiving orders that week for their post-graduation assignment. SDS files were found to furnish reliable information about a recruit's whereabouts up to three months post-graduation. In cases where participants had graduated from RTC but did not appear in SDS files, the Navy's standard personnel file, the Enlisted Master Record (EMR), was checked to determine the status of the participant. The EMR resides on the Naval Health Research Center (NHRC) VAX computer, and was accessed electronically each month and information downloaded to the OSQ main computer. Information about a recruit's present and future command location, along with demographic data, was extracted from the 390-character EMR. In addition, the EMR contained "loss dates" that were used to identify Navy drop-outs/attriters. As a last resort, a hired staff person on-site at RTC could access other specialized Navy databases (i.e., Navy locator file, RTC databases) to identify location and status of the participant. All of these data sources, except SDS, are used to track participants for the 6- and 12-month surveys as well. No fewer than two attempts were made to deliver the surveys to "smokers" using a combination of these sources of information.

#### 5. Survey Procedures

**Entry Survey Procedures.** On P4-day (i.e., fourth day of processing in the training cycle), all female recruits went through the "Wellness Clinic." At this time women received a gynecological exam and were given information in lecture format on several areas of health promotion, including pregnancy and birth control, sexually-transmitted

diseases, and substance abuse (including drugs, alcohol, and tobacco). Prior to being given any health information, the OSQ study was introduced and informed consent procedures were systematically conducted using a 10-minute videotaped presentation. Recruits who volunteered to participate in the study were asked to complete a brief one-page "Entry Survey" related to their tobacco use *prior* to entering the Navy.

**Graduation Survey Procedures.** During the week prior to graduation from recruit training (typically on Week 7-3 day), recruits attended a "Recruit Critique" session during which they provided anonymous feedback by questionnaire or written comments regarding their training. After completing their feedback, any male recruits (if present) were dismissed to muster outside while female recruits remained approximately 15 minutes longer. During this time an OSQ staff member reminded recruits about the study and asked volunteers to complete a brief one-page "Graduation Survey". The "Grad Survey" asks several questions about tobacco use that were similar to the those on the "Entry Survey" (e.g., description of self as a smoker or nonsmoker, intentions to smoke) so that changes during the 8-week period of mandatory smoking cessation could be assessed.

**Follow-up Survey Procedures.** All female recruits who reported on the entry survey that they had *any experience with smoking* (referred to in the present report as "smokers") comprised the follow-up study group. These "smokers" included those who identified themselves as daily smokers, occasional smokers, experimenters, or former smokers. The rationale for the inclusive, liberal definition of "smokers" was based on previous studies of Navy personnel that suggest some new service members may take up the habit once joining the Navy, or may relapse if they had been a former smoker (e.g., Cronan, Conway, & Kaszas, 1991; Bray et al., 1991). It was believed that former smokers at entry, and those who had even experimented with smoking, might be at risk for becoming regular smokers once joining the Navy. Thus, daily smokers as well as those that occasionally smoked, experimented with smoking, and former smokers were targeted for post-RTC intervention and follow-up.

After graduating from recruit training, all participants are sent a 3-month, 6-month and 12-month follow-up survey. The content of the three surveys is identical, and the surveys are color-coded to indicate the assessment time point. Follow-up measures primarily address smoking status and quit attempts. Many items on the follow-up surveys provide the reference point "since graduating from recruit training" so that patterns of relapse and quitting can be determined.

A number of strategies are used to maximize the response rates to the follow-up surveys. A monetary incentive is offered with each survey (i.e., a chance to win \$100.00) for returning completed surveys. The following week, a postcard is sent reminding participants to return their survey for a chance to win \$100.00. If a survey has not been returned within 2 weeks after the initial mailing, trained phone surveyors attempt to contact the nonrespondent by telephone to conduct an abbreviated version of the survey. Phone surveyors are given two weeks to contact and complete any given survey. Finally

six weeks after mailing the original survey, a brief postage-paid "postcard" version of the survey with a few critical items is mailed to nonrespondents. Once again, a chance at winning \$100.00 was offered for completing the "postcard" survey.

For the 12-month follow-up survey, a number of additional procedures are implemented to increase the response rate for this final survey. With the first mailing of the 12-month survey, participants are offered a free pre-paid phone card valid for 10 minutes of long distance phone calls in addition to entering the \$100.00 lottery if they complete and return the survey. Those who do not return the survey from the first mailing are contact by phone, as detailed above. Following the phone survey attempts, those who still have not responded are sent a second 12-month survey with an offer of \$20.00 cash for completing and returning the survey. Participants who do not respond to any of these survey attempts are sent a postage-paid, brief survey postcard. Lastly, nonrespondents are mailed a postcard asking them to call one of two phone numbers *collect* to complete a survey and receive \$20.00.

#### 6. Description of Interventions

Two intervention strategies are employed in this study. One intervention group is encouraged to call a toll-free telephone helpline for support and counseling on how to remain a nonsmoker or how to quit again if relapse has occurred. This is considered an *active* intervention in that it is initiated by the participant. The second intervention group receives a series of regular motivational mailings to support and encourage nonsmoking during the first year of naval service. This is considered a *passive* intervention in that no action is required by the participant.

Both relapse prevention interventions use a cognitive-behavioral approach that assumes behavioral changes such as quitting smoking are primarily due to self-regulation and motivation (Marlatt & Gordon, 1985; Baumeister, Heatherton & Tice, 1994). The interventions address issues specific to women and cessation, and are based on empirical findings on gender differences in smoking cessation (Gritz, Brooks & Nielsen, 1995). Finally, both interventions are designed to address issues relevant to Navy life and utilize strategies for quitting and remaining smokefree that are Navy-specific.

***Mail Intervention Materials Development and Procedures.*** Subjects assigned to the mail intervention condition receive a series of six mailings beginning one month post-graduation and continuing for a period of 10 months. The mailings consist of a colorful, one-page motivational flyer accompanied by a small "behavioral cue" item. The intervention modules are mailed out once per month for the first four months post-RTC, then every three months for the remainder of the 10-month period. Copies of the mail support intervention modules can be found in the 1996 annual report.

***Phone Intervention and Procedures.*** The telephone helpline is an innovative approach to smoking relapse prevention. Women assigned to this condition receive information regarding the 1-888-helpline services prior to leaving recruit training, and are encouraged

to call the number upon leaving recruit training. Incentives such as a pre-paid long distance phone card are offered to encourage phone calls. Once the participant makes the initial call, the helpline counselor schedules a series of follow-up phone calls, thus creating a proactive counseling procedure. This procedure creates a certain level of accountability, as well as fostering social support. The follow-up sessions are scheduled in relation to the participant's probability of relapse, thereby providing assistance when they need it most (Zhu & Pierce, 1995).

The counseling protocol has been adapted to reflect the relapse issues most relevant to Navy women, as discussed above. In particular, the phone counselor helps the caller identify situations in which she feels she is most likely to relapse and works with her to identify responses/alternative actions to take to reduce the likelihood of relapse. In subsequent phone calls, the counselor discusses any relapse episodes and works with the caller to identify better ways to respond in situations that prompt smoking. Alternatively, if the caller has remained quit, subsequent phone calls are used to encourage the success and identify long-term strategies for remaining quit.

## 7. Measures

**All Surveys.** Primary measures for evaluating intervention effects include self-report survey measures of smoking status, smoking frequency and amount, quit attempts, and stage of change for cessation. Investigators from SDSU, UCSD, and NHRC developed smoking measures for this unique population in part based upon those used by other researchers examining smoking and cessation among Navy and civilian personnel (Bray, Marsden, & Peterson, 1991; Bray, Kroutil, Wheelless et al., 1995; Hurtado & Conway, 1996; Conway, Trent, & Conway, 1989; Farkas, Pierce, Zhu, Rosbrook, Gilpin & Berry, 1996). Where possible, comparability with other surveys, such as the DoD worldwide survey of drug use (Bray et al., 1995) and the California statewide tobacco use survey (Pierce et al., 1994), was maintained.

Three brief, color-coded machine-scannable surveys were developed to assess smoking at five different points: RTC entry, RTC graduation, 3-month, 6-month, and 12-month post-graduation. The entry survey includes the consent form, and all the surveys include some personal identifiers, items addressing cigarette, and other correlates of smoking. In addition, questions about quit and intentions to smoke in the future are included (see 1996 Annual Report for copies of all surveys).

**UCSD Data Collection.** The counseling protocol has been developed by UCSD telephone counselors for subjects in the helpline condition. Data collected during the call include background and identifying information, smoking status, self-efficacy and motivation to quit smoking, quitting history, reasons to quit smoking, social support and social influences to smoke and quit, and general health status (e.g., pregnancy). In addition, quantitative data are collected about situations the subject has encountered (or anticipates encountering) that may lead to relapse. Measures will be used to describe the

characteristics of helpline participants and investigate potential predictors of relapse and successful cessation.

***EMR Demographics.*** As mentioned above, the EMR provides important variables for tracking research participants over the course of the study. Tracking variables include current, previous, and future UICs (i.e., commands), dates of transfer to and from UICs, loss codes, sea versus shore status, and regular versus reserve status. In addition to tracking variables, the EMR also provides sociodemographic and command-related information that will be examined as mediators and moderators of intervention effects. These potential mediators and moderators include age (i.e., birthdate), race/ethnic group, rating, paygrade, Navy enlisted classification (NEC), years of education, marital status, number of children, Navy performance and evaluation information, and command size.

#### 8. Analyses

Analyses to date have included descriptive procedures, such as frequency distributions and chi-square analyses of categorical variables. These analyses have been conducted to determine participation rates and examine entry smoking rates of incoming recruits. Chi-square analyses have been conducted to assess correlates of smoking at entry. Tests for differences in proportions have been used to compare recruit and civilian smoking rates. Analyses of entry-to-graduation changes in perceptions of being a smoker and intentions to smoke have included McNemar tests for correlated proportions and paired t-tests.

## B. Results

#### 1. Participation in Intervention and Assessment

Between March 1996 and March 1997, 5,503 women within 87 divisions provided consent and completed entry surveys—93% of those eligible based on counts of recruits provided by RTC rosters. Refusals to provide consent and complete the entry survey were virtually nonexistent, and the 7% of women not completing surveys failed to because of scheduling changes that resulted in their not attending the Wellness Clinic with their division. Near the time of graduation, 4,411 women completed graduation surveys. Of those who completed entry surveys, 350 women were discharged from the Navy before graduating from recruit training. As these women were ineligible to complete graduation surveys, the response rate for the graduation survey was 86%. Not surprisingly, examination of entry smoking rates (i.e., any smoking in the 30 days prior to entering recruit training) showed that those not completing graduation surveys were more likely to smoke (47%) than those completing graduation surveys (41%).

By the end of August, 1997, all participants (n=2,783) had been mailed a 3-month follow-up survey. The response rate to date is 39%. Also as of this date, 2,359 participants have been mailed a 6-month follow-up survey, and 903 participants have been mailed a 12-month follow-up survey. Preliminary response rates for the 6- and 12-month surveys are 30% and 53%, respectively.

Table 1 presents sociodemographic characteristics of women entering the Navy who completed entry surveys over the one-year period. In general, women recruits were young, with over 90% being less than 24 years of age. The mean age was 19 years ( $SD=2.75$ ). The majority (85%) had a high school education. Almost 60% were white/non-Hispanic; Blacks made up a substantial percent of recruits (23%).

The Navy recruit sample was compared to a civilian sample to determine differences in the distribution of important sociodemographic characteristics. Civilian data were taken from the 1992-1993 to the US Bureau of the Census' Current Population Survey Tobacco Use Supplement (CPS-TUS). The Current Population Survey (CPS) is a continuous monthly survey conducted by the Bureau of the Census for the purpose of collecting labor force indicators for the civilian noninstitutionalized population of individuals 15 years and older. Briefly, the CPS is a probability sample based on a stratified sampling scheme of clusters of four neighboring households. The 40-item Tobacco Use Supplement to the CPS was developed by the National Cancer Institute (NCI) primarily to track progress and impact of the large-scale tobacco control project entitled ASSIST (American Stop Smoking Intervention Study for Cancer Prevention). The supplement was used for three months (September 1992, January 1993, and May 1993) and for the present study, data from all three months were combined. Almost 63,000 cases were extracted from the CPU-TUS for women between the ages of 17 and 35 years to correspond to the age range of Navy recruits. Special weights developed by the Bureau of the Census were applied to obtain unbiased estimates for civilians.

As shown in Table 1, demographic characteristics between Navy recruits and civilian women from the CPS-TUS within the same age range differed. While the majority of women coming into the Navy were younger than 24 years, the majority of civilian women were older than 24 years. The mean age of Navy women was 19 years ( $SD=2.75$ ), while the mean age of civilian women was 27 years ( $SD=5.44$ ). Far more of the Navy recruits had a high school education, whereas a higher percentage of civilians had both less than high school and greater than high school education. The Navy recruit sample had a higher percentage of Black women and fewer white/non-Hispanics than did the civilian sample.

Table 1

Sociodemographic characteristics of women entering the U.S. Navy and a civilian sample (ages 17-35 years).

Sociodemographic Characteristic	% in Sample		
	Navy Recruits (n=5,503)	Civilian <sup>a</sup> Unweighted (n=62,832)	Civilian <sup>a</sup> Weighted (n=37,382,796)
Age			
17-18 years	41	9	8
19-23	50	23	24
24 or more years	9	68	68
Education			
Less than high school	6	17	18
High school	85	34	33
More than high school	9	49	49
Race/ethnicity			
White, non-Hispanic	58	74	72
Black	23	12	14
Hispanic	12	9	10
Asian/Pacific Islander	4	4	3
Native American	2	1	0.6

<sup>a</sup> Civilian estimates based on the 1992-1993 Current Population Survey, Tobacco Use Supplement.

## 2. Extent of Intervention Delivery

**Mail Support.** Modules 1, 2, 3 and 4 have been mailed to all participants in the intervention condition (approx. 1000). To date, module 5 has been mailed to over 600 participants, and module 6 has been mailed to over 400 participants. If needed, two attempts are made to deliver successfully all intervention mailings, and the outcome of attempts is recorded (i.e., delivered at first attempt, delivered at second attempt, not deliverable). The rate of undeliverable mail, to date, is quite low, approximately 3%. The mail support intervention will be completed by March, 1998.

**Telephone Helpline.** To date, 15 participants have contacted the 1-888 telephone helpline. Out of these 15 women, only 2 have been interested in completing the full counseling protocol.

## 3. Prevalence of Smoking Among Navy Women Recruits and Comparison with Civilians

**Smoking and Cessation Experience at Entry to Recruit Training.** Table 2 presents information about smoking history as reported at entry to recruit training by all recruits. Nearly 42% of the women recruits reported having smoked 100 cigarettes in their entire

life. When asked to describe themselves *prior to recruit training* according to five smoking categories, 45% reported having never smoked, 29% reported they were daily smokers, 12% reported they were occasional smokers, 11% reported they were experimenters, and 3% categorized themselves as former smokers. The average age (median) of fairly regular use was 16 years. Slightly over one-fourth of all recruits reported smoking as recently as the day they arrived at recruit training; 40.6% reported smoking within 29 days prior to RT. Among smokers, 66% reported smoking everyday prior to entering RTC, and 34% reported smoking only some days. An item assessing the quantity of cigarettes smoked during the 30 days prior to RTC showed that women smoked an average of 6-10 cigarettes (median category) on typical days that they smoked. This item was used to compute a 30-day prevalence, and showed that 42.5% of recruits reported any smoking in the past 30 days. Prior to entering RTC, 10% of smokers had their first cigarette of the day immediately upon waking, although a full 30% did not smoke until more than two hours after waking.

Table 2

Smoking history of women recruits upon entry to RTC.

Item	n	% of total	% excluding NA
<u>Have you smoked 100 cigarettes (5 packs) in your entire life?</u>			
No	3201	58.3	---
Yes	2289	41.7	---
<u>How would you describe yourself prior to recruit training?</u>			
Never Smoked	2467	44.8	---
Experimented with smoking	624	11.3	---
Occasional Smoker	644	11.7	---
Daily Smoker	1586	28.8	---
Former Smoker	182	3.3	---
<u>At what age did you first start smoking fairly regularly?</u>			
NA - have never smoked regularly	3149	57.4	---
Under 12 years	81	1.5	3.5
12	138	2.5	5.9
13	182	3.3	7.8
14	251	4.6	10.7
15	340	6.2	14.5
16	489	8.9	20.9
17	345	6.3	14.8
18	282	5.1	12.1
19	104	1.9	4.4
20	57	1.0	2.4
21 years or older	69	1.3	3.0

Table 2 (con'd)

Smoking history of women recruits upon entry to RTC.

Item	n	% of total	% excluding NA
<u>When was the last time you smoked a cigarette?</u>			
NA - have never smoked regularly	2499	45.5	---
Day arrived at recruit training	1430	26.0	47.7
1-7 days before recruit training	599	10.9	20.0
8-29 days before recruit training	202	3.7	6.7
1-3 months ago	189	3.4	6.3
4-6 months ago	115	2.1	3.8
7-11 months ago	108	2.0	3.6
1-4 years ago	229	4.2	7.6
5 or more years ago	126	2.3	4.2
<u>Prior to recruit training, did you smoke cigarettes every day or some days?</u>			
NA - did not smoke prior to recruit training	2999	54.9	---
Every day	1628	29.8	66.0
Some days	837	15.3	34.0
<u>During the 30 days prior to recruit training, how many cigarettes did you smoke on a typical day when you smoked cigarettes?</u>			
NA - did not smoke any cigarettes in the last 30 days	3157	57.5	---
Less than 1 cigarette on average	309	5.6	13.2
1-5 cigarettes	523	9.5	22.4
6-10	394	7.2	16.9
11-15	299	5.4	12.8
16-20	417	7.6	17.8
21-25	169	3.1	7.2
26-30	104	1.9	4.5
31-35	38	.7	1.6
36-40	49	.9	2.1
More than 40 cigarettes	35	.6	1.5
<u>During the 30 days prior to recruit training, how soon after waking up would you usually smoke your first cigarette?</u>			
NA - did not smoke prior to recruit training	3221	58.7	---
Immediately after waking up	227	4.1	10.0
Within 15 minutes after waking up	436	8.0	19.3
15-30 minutes after waking up	347	6.3	15.3
31-60 minutes after waking up	297	5.4	13.1
61 minutes - 2 hours after waking up	277	5.1	12.2
More than 2 hours after waking up	678	12.4	30.0

Table 3 presents smoking cessation history among incoming women recruits as reported at entry to RTC. Approximately 65% of those who had smoked reported having ever tried to quit, and over half of these had tried within the three months prior to entering recruit training. The last quit attempt among those who had tried within the past 12 months lasted an average (median) of 8-29 days, although 44% relapsed within seven days. The longest average (median) quit attempt was 1-3 months in duration. Those attempting to quit within the past 12 months reported having made, on average (median), two attempts, although 20% had made five or more attempts within that timeframe.

Table 3

Smoking cessation history of women recruits upon entry to RTC.

Item	n	% of total	% excluding NA
Before recruit training, had you ever tried to quit smoking?			
NA - have never smoked	2797	51.5	---
No	917	16.9	34.8
Yes	1718	31.6	65.2
Before recruit training, when was the <u>last time</u> you tried to quit smoking?			
NA- have never smoked	2798	51.0	---
Have never tried to quit	874	15.9	---
1-7 days before recruit training	161	2.9	8.9
8-29 days before recruit training	317	5.8	17.4
1-3 months before recruit training	451	8.2	24.8
4-6 months before recruit training	241	4.4	13.2
7-11 months before recruit training	188	3.4	10.3
1-4 years before recruit training	375	6.8	20.6
5 or more years before recruit training	86	1.6	4.7
Considering the <u>last time</u> you tried to quit smoking during the past 12 months, how <u>long</u> did you stay quit? (Do not count recruit training.)			
NA - did not smoke in the past 12 months	2940	53.6	---
Did not try to quit in the past 12 months	907	16.5	---
Less than 24 hours	123	2.2	7.5
1 day	113	2.1	6.9
2-7 days	494	9.0	30.1
8-29 days	301	5.5	18.3
1-3 months	269	4.9	16.4
4-6 months	135	2.5	8.2
7-11 months	101	1.8	6.2
1 year or more	106	1.9	6.5

Table 3 (con'd)

Smoking cessation history of women recruits upon entry to RTC.

Item	n	% of total	% excluding NA
Not counting recruit training, what was the <u>longest time</u> you have ever quit smoking?			
NA - have never smoked	2783	50.7	---
Have never tried to quit	726	13.2	---
Less than 24 hours	70	1.3	3.5
1 day	74	1.3	3.7
2-7 days	402	7.3	20.3
8-29 days	283	5.2	14.3
1-3 months	333	6.1	16.8
4-6 months	201	3.7	10.1
7-11 months	168	3.1	8.5
1 year or more	452	8.2	22.8
Not counting recruit training, <u>how many times</u> have you tried to quit smoking for one day or longer during the past 12 months?			
NA - did not smoke in the past 12 months	2981	54.5	---
Did not try to quit in the last 12 months	948	17.3	---
Never quit for a whole day	60	1.1	3.9
Once	420	7.7	27.3
Twice	371	6.8	24.1
Three times	276	5.0	1.8
Four times	97	1.8	6.3
Five or more times	313	5.7	20.4

***Correlates of Smoking at Entry to RTC.*** Several sociodemographic variables were examined as possible correlates of smoking at entry to RTC, including age, education, race/ethnicity, and season of entry (see Table 4). Smoking prevalence was based on having smoked at all in the 30 days prior to entering RTC. Chi-square analyses showed that entry smoking rates varied significantly by age. Those women 19-23 years of age had the highest past-month smoking rate (45%); women 24 years and older had the lowest rate (34%). Close to half of the white/non-Hispanics (54%) and Native Americans (49%) reported smoking in the month prior to entering RTC. Black women had considerably lower smoking rates (17%) relative to all other racial/ethnic groups. Education level was associated with smoking in a linear fashion, with those having less than a high school education reporting the highest rates. Recruits entering training in the summer, fall, and winter seasons had similar smoking rates (41%), although those entering in the spring months (March-May) reported a significantly higher rate of

smoking (47%). These findings confirmed anecdotal reports of seasonal variations in "quality" of recruits, including variations in health behavior. Most Navy informants expected that summer recruits would have the lowest smoking rates in part because of their commitment to join the military immediately after graduating from high school, and that winter recruits would have the highest rate, perhaps because they may have been unable to secure employment after graduation and joined the Navy as a "last resort." In the present study, however, this expectation was not confirmed, and in fact, the month of May showed the highest past-month smoking rate (48%).

Table 4

Sociodemographic correlates of smoking in the past 30 days among incoming women recruits.

Correlate	n	% Smoking	$\chi^2$
Age			
17-18	2250	40.6	
19-23	2757	45.4	
24 and older	463	34.3	25.66***
Race/ethnicity			
White non-Hispanic	3165	54.2	
Black	1269	17.2	
Hispanic	669	36.8	
Asian/Pacific Islander	228	33.8	
Native American	130	49.2	530.18***
Education			
Less than high school	301	56.8	
High school	4658	43.0	
Greater than high school	513	30.4	56.29***
Season of Entry			
Spring (March-May)	1164	47.4	
Summer (June-Aug)	1689	41.3	
Fall (Sept-Nov)	1715	41.0	
Winter (Dec-Feb)	925	41.4	14.52**

\*\*  $p \leq .01$

\*\*\*  $p \leq .001$

It is possible that several of these sociodemographic correlates are themselves intercorrelated. For example, those with greater than a high school education are likely to be older. A logistic regression analysis was conducted to determine the *independent* association of the sociodemographic factors with smoking status at entry. As shown in Table 5, all four variables were significantly and independently related to smoking at entry. Women 19-23 years of age had higher smoking rates than 17-18 year olds, although the rate among the oldest age group (24 and older) was not significantly different from that of 17-18 years olds. Blacks, Hispanics, and Asian/Pacific Islanders had significantly lower rates than Whites, although Native Americans did not differ significantly from Whites. Relative to those with more than a high school education, the odds of smoking were 3.8 times greater among those with less than a high school education, and about twice as likely among those with only a high school education. Summer, fall, and winter recruits all had lower smoking rates than recruits entering the Navy during the spring months (March-May).

Table 5

Results of logistic regression predicting past 30-day smoking among incoming women recruits.

Correlate	Adjusted OR	95% CI
<b>Age</b>		
17-18 <sup>a</sup>	-	-
19-23	1.22	1.08, 1.39
24 and older	.85	.67, 1.27
<b>Race/ethnicity</b>		
White non-Hispanic <sup>a</sup>	-	-
Black	.17	.14, .20
Hispanic	.46	.40, .55
Asian/Pacific Islander	.45	.34, .60
Native American	.83	.58, 1.19
<b>Education</b>		
Less than high school	3.79	2.74, 5.21
High school	1.94	1.55, 2.42
Greater than high school <sup>a</sup>	-	-
<b>Season of Entry</b>		
Spring <sup>a</sup>	-	-
Summer	.77	.65, .91
Fall <sup>.80</sup>	.68, .94	
Winter	.79	.69, .95

<sup>a</sup> Reference group

**Comparison with Civilian Rates.** Civilian smoking data were taken from the 1992-1993 US Bureau of the Census' Current Population Survey, Tobacco Use Supplement (CPS-TUS). To compare the smoking prevalence of Navy recruits and civilians, the definition of "current smokers" that was used differs from that used in other sections of this report. The definition for these comparisons is the one that the CPS-TUS routinely uses, and the two items used to compute the rate were identical on the CPS-TUS and Navy surveys. In each sample, women reporting having smoked 100 cigarettes in her life and being an everyday or someday smoker were coded as current smokers.

Table 6 presents unstandardized rates of current smoking for Navy recruits and civilian women overall, and by age, education, and race/ethnicity. Unstandardized rates overall were 39% and 24% for Navy recruits and civilians, respectively. Unadjusted recruit rates exceeded those of civilians in every age and education category. Navy smoking rates were significantly higher than civilian rates among white/non-Hispanics, Hispanics, and Asian/Pacific Islanders. Navy recruits who were Native Americans also had higher rates than their civilian counterparts, although the difference did not reach statistical significance at the required level (i.e.,  $p \leq .001$ ).<sup>1</sup> The one exception to the pattern was the higher smoking rate of civilian Blacks relative to Black Navy recruits.

Table 6

Unstandardized prevalence of current smoking among Navy women recruits and civilians, ages 17-35.

Sociodemographic Characteristic	% Current Smoker	
	Navy Recruits	Civilian <sup>a</sup>
Overall	39	24*
Age		
17-18	36	12*
19-23	42	21*
24-35	34	27*
Education		
Less than high school	56	30*
High school	39	32*
Greater than high school	29	17*
Race/Ethnicity		
White non-Hispanic	51	27*
Black	12	20*
Hispanic	30	12*
Asian/Pacific Islander	32	7*
Native American	46	37

<sup>a</sup> Based on weighted frequencies from the Current Population Survey, Tobacco Use Supplement.

\*  $p \leq .001$

<sup>1</sup> This more stringent alpha level was generally used because of the large number of tests performed and large sample sizes.

Table 7

Current smoking rates among Navy women recruits and civilians<sup>a</sup> by age, education, and race/ethnicity.

Age/ Education	% Current Smoker							
	White Non-Hispanic	Black	Hispanic	Asian/ Pac. Islander	Native American			
	Navy	Civilian	Navy	Civilian	Navy	Civilian		
17-18 years								
Less than HS	75	16*	13	04	43	05*	--	08
High School	48	19*	09	04*	28	07*	33	20
Greater than HS	--	12	--	03	--	00	--	00
19-23 years								
Less than HS	73	54*	36	24	46	12*	--	09
High School	54	34*	14	11	32	11*	38	18*
Greater than HS	44	16*	05	06	21	07	11	05
24-35 years								
Less than HS	70	60	17	39	30	14	--	12
High School	52	38*	27	28	22	16	29	10
Greater than HS	34	19*	03	17	09	12	13	05
							--	64
							--	47
							--	36

<sup>a</sup> Based on weighted frequencies from Current Population Survey, Tobacco Use Supplement

-- Navy ns too low to conduct comparison

\*  $p \leq .001$

Because the sociodemographic composition of Navy recruit and civilian populations differ greatly (see Table 1), the direct comparisons in Table 6 may not provide a clear understanding of the extent of differences in smoking rates. One method for accounting for differences in the distribution of sociodemographic characteristics is to examine smoking rates that are age-education-race specific. Typically, sample sizes are not large enough to present rates at this level of specificity, but the present study provided enough Navy and civilian individuals to conduct such a comparison. Table 7 presents current smoking rates broken down by education within age and within race/ethnicity. For some age-education-race categories, Navy and civilian comparisons could not be made because the number of Navy women recruits was too small to compute a reliable rate. For example, there were too few recruits with more than a high school education in the 17-18 year age range. In addition, there were too few Native American recruits in the various age and education levels to conduct comparisons. However, enough specific comparisons could be made to show a relatively consistent pattern in which Navy smoking rates were higher than civilian. Of the comparisons made, over 80% showed Navy rates to be higher than civilian, although all of these did not reach the .001 level of significance. For the most part, recruit rates were higher than civilian rates in every age-education-race category with a few notable exceptions. Although recruits who were white/non-Hispanic, Hispanic, Asian/Pacific Islander, and Native American generally smoked more than their civilian counterparts in most age and education levels, Blacks showed a different pattern. Black Navy recruit smoking rates were less likely to be significantly higher than civilian rates, and rates among the oldest Black recruits (24-35 years) were consistently lower than their civilian counterparts (although not statistically significant).

Another method for making comparisons between populations that differ with regard to sociodemographic characteristics is to use a direct standardization method to adjust for these differences so that meaningful comparisons can be made. Such a procedure was used in the present report, similar to that previously used by Bray and colleagues in comparisons of Navy personnel and civilians on drug and alcohol use (Bray et al., 1995). The civilian and Navy recruit datasets were equated for age, with women between the ages of 17-35 included. Civilian data were standardized to the joint distribution of the Navy recruit sample in terms of education and race/ethnicity. Comparisons were made within three age strata: 17-18, 19-23, and 24-35 years.

With direct standardization, cells are formed by a complete cross-classification of the standardizing variables (Bray et al., 1995). In the present study, education (3 categories) and race/ethnicity (5 categories) were the standardizing variables. A complete cross-classification of these variables from the Navy recruit dataset produced 15 (5x3) cells.

Software for Survey Data Analysis, version 5.30 was used to produce estimates for the civilian data. SUDAAN was designed specifically for analysis of data from complex sample surveys and has the capability of calculating standard errors of proportions in accordance with the sampling design. SUDAAN's DESCRIPT procedure was used to produce standardized smoking prevalence estimates and standard errors. The weights produced from the Navy data by the cross-classification of education and race/ethnicity

were applied to the civilian data using the DESCRIPT procedure. Estimates obtained for the civilian population by this method can be interpreted as the percentage that would be obtained if the civilian population had the same sociodemographic distribution as Navy recruits. Unstandardized estimates for the Navy sample were compared with standardized estimates for the civilian sample using a difference of proportions test.

Results of the standardized comparison of current smoking between Navy women recruits and civilian women, stratified by age, are presented in Table 8. After standardization, the overall prevalence of current smoking was significantly greater among Navy women recruits (38.7%) than among civilian women (28.8%). Standardized comparisons for women 17-18 years old and those 19-23 years old were statistically significant with Navy women recruits having higher rates of current smoking in both of these age strata. Navy women recruits who were 17-18 years old had 2½ times the rate of current smoking than civilian, and women 19-23 had over 1½ times the rate of civilians. After standardization, rates of current smoking were not significantly different for Navy and civilians in the 24-35 age range.

Table 8

Comparison of Current Smoking Rates among Navy Women Recruits and Civilians, ages 17-35.

Age	% Current Smokers (SE)			
	Navy Recruits		Civilian	
			Unstandardized	Civilian Standardized <sup>a</sup>
Overall	38.7	(.66)	24.2 (.18)*	28.8 (.29)*
17-18	36.0	(1.01)	12.6 (.49)*	13.8 (.97)*
19-23	41.7	(.93)	21.1 (.37)*	24.8 (.57)*
24-35	33.5	(2.19)	26.7 (.23)*	32.0 (.36)

<sup>a</sup> Estimates have been standardized to the Navy distribution of education and race/ethnicity

\* Significantly different from Navy estimate,  $p \leq .001$

#### 4. Entry to Graduation Changes

**Entry-to-graduation Changes in Perceptions of Being a Smoker.** Among the 4,393 recruits who provided entry and graduation survey data on smoking status, 41.4% (n=1,819) were smokers at entry (i.e., reported any smoking in the 30 days prior to RTC). Slightly over 25% of the group (n=1,110) reported being a smoker at graduation, a statistically significant reduction of 39% (McNemar  $\chi^2 = 665.7$ ,  $p \leq .001$ ).

This change in perceptions of smoking status can better be interpreted by comparing it to changes that would have occurred without the 8-week ban on smoking. Prior to the implementation of the smoking ban that is now required in basic training, Cronan, Conway, & Hervig (1989) conducted a study of the relative effectiveness of several smoking prevention/cessation interventions with male recruits at RTC, San Diego. Control group data from that study provides an estimate of "spontaneous" changes in smoking status that one could expect given no smoking ban. Smoking prevalence among this small group of 101 men at entry was 19% and at graduation was 26.7%, a statistically significant *increase* of 29% in the proportion of current smokers (McNemar exact test for correlated proportions, two-tailed,  $p < .05$ ). Although the definition of smoking and the sex of recruits differed in the present study and the Cronan et al. (1989) study, the differences in the direction and magnitude of change makes a compelling case for the effect of the ban in changing perceptions of one's smoking status.

Figure 1 presents more specific information about how entry *smokers* viewed themselves at graduation. Approximately 60% of those reporting they had smoked in the 30 days prior to RTC reported they were still smokers at graduation; 37% considered themselves non/former smokers at graduation. A small percent (2.3%, n=42) of entry smokers reported at graduation that they had never smoked. Examination of other items for this small number of individuals showed that the majority of them were infrequent smokers (60% experimenters and 31% occasional smokers) and 74% reported smoking less than one cigarette on typical days when they smoked. In short, most of these individuals were infrequent and very light smokers who, by graduation, considered themselves to be "never smokers."

**Figure 1**

Perceived smoking status at graduation among entry smokers.

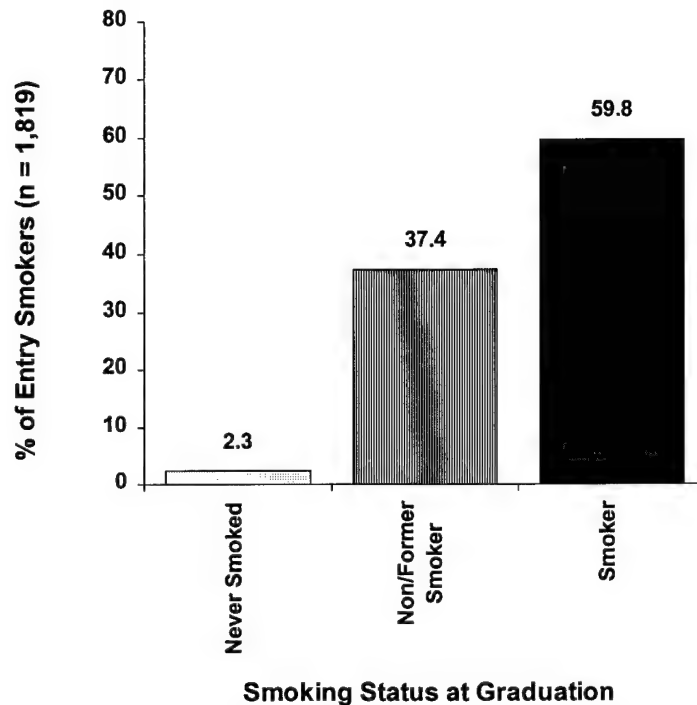
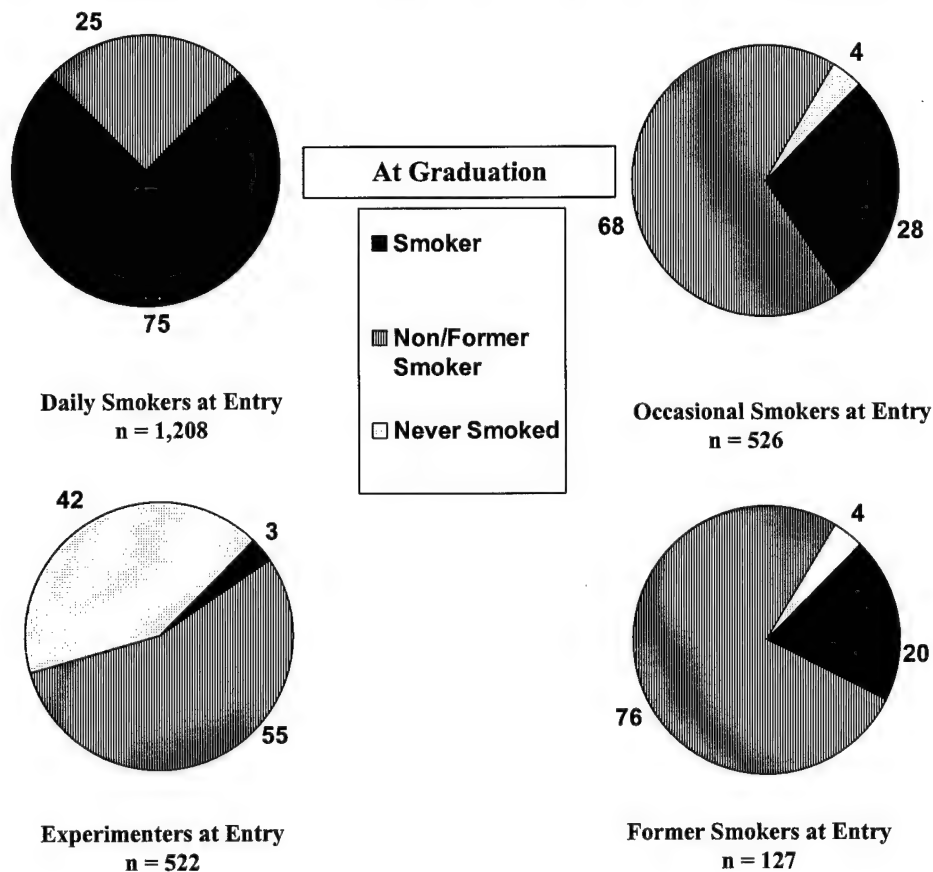


Figure 2 presents graduation smoking status by the type of entry smoker. In general, the more frequently the individual smoked before entering RTC, the less likely she was to consider herself a non-smoker by graduation. Among daily smokers at entry, 75% considered themselves smokers at graduation. The percentage of occasional smokers at entry who considered themselves smokers at graduation was 28%; only 3% of experimenters at entry saw themselves as smokers at graduation. Of particular interest, a full 20% of women reporting at entry that they were former smokers considered themselves smokers by graduation.

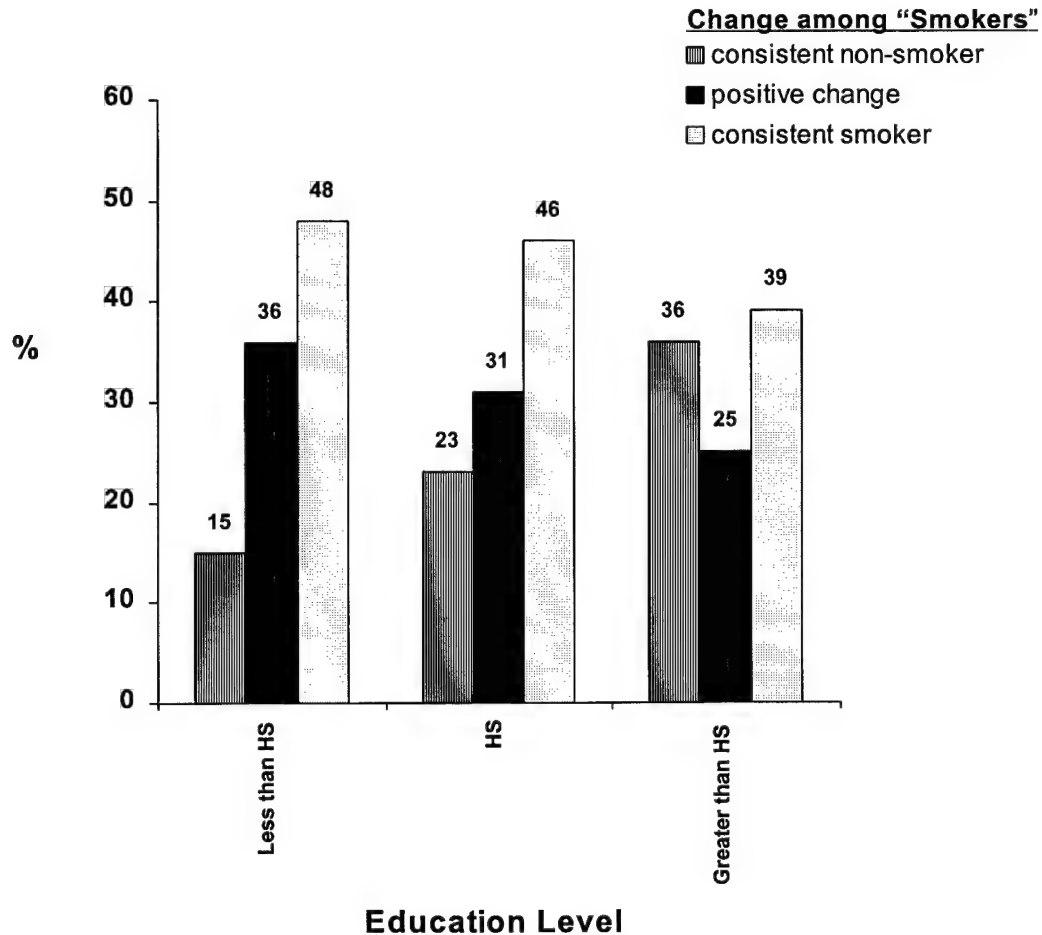
**Figure 2**Perceived smoking status at graduation by entry smoking type.

**Correlates of Changes in Perceptions of Being a Smoker.** Several sociodemographic and baseline smoking variables were examined as correlates of changes in perceptions of being a smoker. Potential correlates included age, education, race/ethnicity, and two measures of addiction (i.e., baseline smoking level, and when the first cigarette of the day is typically smoked). To examine correlates of changes in perceptions of being a smoker, four change groups were created: (1) those consistently (i.e., at entry and graduation) perceiving themselves as non-smokers, (2) those making a “negative” change, from non-smoker at entry to smoker at graduation, (3) those making a “positive” change, from smoker at entry to non-smoker at graduation, and (4) those consistently perceiving themselves to be smokers. This change variable was based on two items: (1) an entry survey item that asked about number of cigarettes smoked in the 30 days prior to entering RTC, and (2) a graduation survey item that asked individuals to categorize themselves into one of three categories: never smoked, non-smoker/former smoker, or smoker (even

though not allowed to smoke during training). Both entry and graduation items were recoded into dichotomous variables, with 0 indicating non-smoker and 1 indicating smoker. The entry survey item was recoded such that *any* smoking in the 30 days prior to RTC was coded as a 1; never smoked and non-smoker/former smoker responses were combined and coded to 0 for graduation.

Among all participants, 58% (n=2,552) were consistent non-smokers, 0.5% (n=22) made a negative change, 17% (n=748) made a positive change, and 25% (n=1100) consistently perceived themselves to be smokers. The group of women making a negative change from entry to graduation was very small, and therefore those 22 women were dropped as a group from the analysis of correlates.

The analysis of correlates was limited only to "smokers" who reported any experience with smoking prior to RTC. There was a tendency for older recruits (24-35 year age range) to be consistent in their perceptions of being a non-smoker, while recruits in the middle age range (19-23) were disproportionately likely to report a consistent perception of being a smoker. However, the association did not meet the alpha level required ( $p \leq .001$ ). Figure 3 shows the statistically significant association between change in perceptions of being a smoker and education level ( $\chi^2=22.61$ ,  $df=4$ ,  $p \leq .001$ ). About half of both those with a high school education (46%) and those with less than a high school education (48%) reported consistently over time that they were smokers. Among those with greater than high school education, near-equal percentages consistently reported being a non-smoker (36%) and a smoker (39%). Making a positive change was inversely related to education level, such that those with less education were more likely to make such as change than were those with more education.

**Figure 3****Change in perceptions of being a smoker by education.**

Changes in perceptions of being a smoker were statistically significant by race/ethnicity ( $\chi^2=62.95$ ,  $df=8$ ,  $p < .001$ ). White/non-Hispanics (50%) and Native Americans (50%) were more likely than Blacks (28%), Hispanics (37%), and Asian/Pacific Islanders (39%) to be consistent in their perceptions of being a smoker. Blacks (36%) were more likely than any other ethnic group (20-29%) to consistently report being a non-smoker. Percentages of participants making a positive change ranged from 29% (White/non-Hispanic) to 36% (Black).

As one would expect, entry-to-graduation changes in perceptions of being a smoker varied by level of addiction at entry to RT. Compared to those making a positive change, those consistently reporting they were smokers consumed more cigarettes at baseline

( $F(1,733)=278.08, p < .001$ ), and typically smoked their first cigarette of the day earlier ( $F(1,1733)=221.96, p < .001$ ).

***Assessment of the Effect of Division Clustering on Changes.*** Because all activities at RTC, including the entry and graduation tobacco use assessments, were conducted by division it was necessary to assess changes taking into account clustering by division. Although divisions form in a haphazard way as recruits arrive at RTC, it is possible that members of a division may over time resemble one another due to exposure to attitudes and behaviors of others in the division or to the Recruit Division Officer (RDO). To assess the dependence in the smoking change data that is accounted for by division, intraclass correlations and inflation factors were computed for three smoking measures of interest: (a) intentions to smoke after leaving RTC, (b) see oneself as a smoker in the future, and (c) a dichotomous smoking variable (yes versus no). Intraclass correlations computed from oneway analysis of variance results did not exceed .007, and inflation factors did not exceed 1.3. Random effects regression models were conducted to assess entry-to-graduation change in these variables, and their results were compared to those from traditional analyses that assume independence of observations. Regression coefficients using the two procedures were very similar, underscoring the negligible effect of division clustering on change. An additional concern was the effect that a given RDO might have on his/her divisions. For example, although smoking is prohibited at RTC, an RDO who smokes might make pro-smoking statements that influence the smoking-related attitudes and intentions of those in his/her division. One other analysis was considered whereby specific RDOs would be used as the cluster unit, rather than the division. However, during the course of the study, only one RDO led more than one division, and so the analysis would not have differed from that conducted by division.

***Changes in Intentions to Smoke after RTC.*** Table 9 presents entry-to-graduation changes in intentions to smoke after leaving RTC, and view of oneself as a smoker "a year from now." Early analyses on all participants showed an unexpected finding—the percent of recruits reporting intentions not to smoke decreased slightly from entry to graduation. For example, those responding that they definitely did not intend to smoke decreased from 63% to 60%, and the percent responding that they definitely did intend to smoke increased from 4 to 7%. The expectation was that, after almost eight weeks of cessation (albeit involuntary), the percent of women who intended not to smoke after leaving RTC would increase. This unexpected finding also was reflected in changes in mean intention scores ( $t(4363)=-10.62, p \leq .001$ ), where 1 indicates low intention and 4 indicates high intention to smoke.

Intention change among *smokers* was analyzed separately, with even more striking results. Among "smokers" (i.e., those with any smoking experience prior to entering RTC), there was a considerable shift in intentions to smoke, particularly in the "probably no" and "probably yes" categories. Among past 30-day smokers, the shift was even greater, with the percent definitely intending to smoke increasing 60% over time.

A similar pattern was seen in entry-to-graduation changes in recruits' view of themselves in "a year from now." There was an increase in the percent of recruits who view themselves as someone who smokes, and this increase was evident overall, among "smokers" with any smoking experience, and particularly among past 30-day smokers.

Table 9

Changes in Intentions to Smoke and View of Oneself as a Smoker Overall and Among Smokers.

Item	<u>All Participants</u>		<u>"Smokers"<sup>a</sup></u>		<u>Past 30-day Smokers</u>	
	entry	grad	entry	grad	entry	grad
After leaving recruit training, do you intend to smoke?						
Definitely No	63	60	34	31	18	16
Probably No	18	15	31	25	36	27
Probably Yes	15	18	28	33	36	41
Definitely Yes	4	7	8	12	10	16
Mean (SD)	1.62(.90)	1.71(.98)*	2.10(.96)	2.26(1.03)*	2.38(.90)	2.57(.94)*
A year from now, do you see yourself as someone who smokes?						
Definitely No	64	60	38	31	24	16
Probably No	18	17	31	28	36	32
Probably Yes	15	20	27	35	35	45
Definitely Yes	2	3	4	6	5	8
Mean (SD)	1.55(.83)	1.66(.90)*	1.97(.91)	2.16(.93)*	2.22(.87)	2.43(.85)*

<sup>a</sup> = Reported any smoking experience at entry to RTC.

\*  $p \leq .001$

Table 10 continues the analysis by *type* of entry smoker. In general, more frequent smokers were more likely to report intentions to smoke at both entry and graduation, and were more likely to show "negative" changes in intentions over time. Among never smokers and experimenters, there was no statistically significant change in intentions. At both entry and graduation, the great majority of never smokers (95-95%) and experimenters (78%) definitely did not intend to smoke after leaving RTC. However, the pattern was different for daily, occasional, and former smokers. Only 11% of daily smokers reported at baseline that they definitely did not intend to smoke after leaving RTC, and that percentage had decreased to 8% by graduation. A considerable number of daily smokers had shifted from the two "No" categories to the two "Yes" categories over time. A third of the occasional smokers reported a definite intention not to smoke at baseline, a much larger percent than among daily smokers. However, similar to daily smokers, the percent of occasional smokers in the "No" categories decreased over time, and the percent in the "Yes" categories increased. Of particular interest are the women who identified themselves at entry as Former Smokers. Although 73% of them definitely did not intend to smoke at baseline, only 59% of them reported that intention at graduation.

Table 10

## Changes in Intentions to Smoke and View of Oneself as a Smoker by Type of Entry Smoker.

Item	Daily Smokers		Occasional		Experimented		Former		Never	
	entry	grad	entry	grad	entry	grad	entry	grad	entry	grad
After leaving recruit training, do you intend to smoke?										
Definitely No	11	8	33	29	78	78	73	59	97	95
Probably No	34	23	41	37	17	18	13	17	3	4
Probably Yes	42	48	25	29	4	4	8	18	0	1
Definitely Yes	14	21	2	5	1	0	6	6	0	0
Mean (SD)	2.59(.85)	2.82(.86)*	1.95(.80)	2.09(.87)*	1.28(.60)	1.28(.57)	1.47(.89)	1.70(.95)*	1.04(.25)	1.06(.28)
A year from now, do you see yourself as someone who smokes?										
Definitely No	14	8	41	29	82	77	75	58	95	95
Probably No	34	28	42	42	15	18	13	19	4	4
Probably Yes	45	54	16	27	2	4	9	20	1	1
Definitely Yes	7	11	1	1	1	0	3	3	0	0
Mean (SD)	2.45(.82)	2.67(.77)*	1.77(.74)	2.00(.78)*	1.21(.50)	1.27(.54)	1.39(.78)	1.68(.90)*	1.06(.29)	1.06(.29)

• =  $p \leq .001$

In general, then, results showed that the overall increase in intentions to smoke after leaving RTC was largely due to intention change among the more regular and former smokers. Over the eight weeks of training, these individuals became more determined to smoke after leaving RTC, perhaps due to feelings of deprivation and loss of personal freedom during training. Another explanation may be that because the training experience is stressful for many, some recruits over time may have begun to look forward to resuming smoking after graduation as a potential stress-reduction strategy.

Subgroup analyses were conducted to explore the apparent discrepancy between changes in perceptions of being a smoker (i.e., a positive change overall) and changes in intentions to smoke (i.e., a negative change overall). Table 11 presents entry and graduation mean intention scores by changes in perceptions of being a smoker for those individuals with any smoking experience at entry to RTC. Those consistently perceiving themselves as non-smokers, those making a positive change in perceptions of being a smoker, and those making a negative change in perceptions of being a smoker made only small changes in intentions to smoke after leaving RTC. On the other hand, those perceiving themselves consistently as a smoker showed a large entry-to-graduation increase ( $p \leq .001$ ) in intentions to smoke after leaving RTC. In summary, the apparent incongruity between overall changes in perceptions of being a smoker and intentions to smoke was primarily limited to those individuals who were consistent in their perception of themselves as smokers.

Table 11

Entry-to-Graduation Change in Perceptions of Being a Smoker by Intention Change among "Smokers".

Change in Perceptions of Being a Smoker	Mean Intention Scores		Paired t	n
	Entry	Grad.		
Consistent Smoker	2.69	3.06	-15.59*	1,074
Negative Change	1.82	2.73	-3.19	11
Positive Change	1.92	1.85	-2.12	720
Consistent Non-smoker	1.19	1.25	-2.74	550
Total	2.10	2.26	-10.43*	2,355

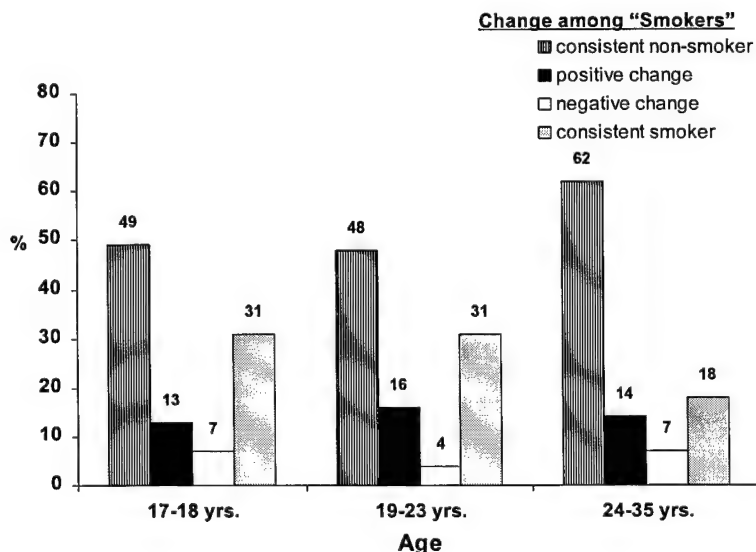
\*  $p \leq .001$

The pattern of responses to the item assessing how one views herself “a year from now” was similar to that seen for intentions to smoke after leaving RTC. Entry-to-graduation increases in the percent seeing oneself as a smoker in a year were statistically significant for daily smokers, occasional smokers, and former smokers.

**Correlates of Changes in Intentions to Smoke.** To examine sociodemographic and baseline smoking correlates of changes in intentions, a simple change variable was computed. At both entry and graduation, “definitely no” and “probably no” categories were combined and assigned as 0, and “definitely yes” and “probably yes” categories were combined and assigned as 1. Four intention change groups were created from the cross-tabulation of the two recoded dichotomous intention items: (1) those consistent in their intention not to smoke after leaving RTC, (2) those making a negative change from no intention at entry to intention to smoke at graduation, (3) those making a positive change entry-to-graduation from intention to smoke to no intention, and (4) those consistently reporting no intention to smoke. Overall, 72% of participants (n=3,144) were consistent in their intentions not to smoke, and 16% (n=717) were consistent in their intentions to smoke. Eight percent (n=363) and 3% (n=140) made negative and positive changes, respectively.

As with examination of correlates of perceptions of smoking status, analyses were limited to “smokers,” or those with any smoking experience prior to RTC. As shown in Figure 4, age was significantly related to changes in intentions among those with any smoking experience, with younger individuals (17-28, and 19-23 years) more likely than older individuals to report a consistent intention to smoke ( $\chi^2=26.36$ ,  $df=6$ ,  $p < .001$ ).

**Figure 4**  
Change in intentions to smoke by age.



Intention change was not significantly related to education, although differences were found by racial/ethnic group ( $\chi^2=41.38$ ,  $df=12$ ,  $p \leq .001$ ). Blacks were more likely to report a positive change and less likely to report a negative change than were other racial/ethnic groups.

Baseline level of addiction was related to intention change. Those consistent in their intention smoked the heaviest of the four intention groups, followed by those making a negative change, those making a positive change, and finally, those consistent in their intentions not to smoke after leaving RTC ( $F(3,1717)=60.23$ ,  $p < .001$ ). Similarly, changes in intentions to smoke were related to when smokers typically had their first cigarette of the day ( $F(3,1717)=59.12$ ,  $p < .001$ ). Those consistent in their intentions to smoke had their first cigarette of the day earlier upon waking than other intention groups, followed by those making a negative change, those making a positive change, and finally, those consistent in their intentions not to smoke after leaving RTC.

***Recruit Perceptions of RTC No-smoking Policy.*** Table 12 presents responses to several graduation survey items addressing perceptions of the RTC no-smoking policy, policy enforcement, and effects of the policy. The great majority of women recruits knew the RTC rules that ban smoking during training, and most reported that the rules were enforced. Over 60% reported being reminded or encouraged NOT to smoke. Few women (3-4%) reported smoking during training or knowing other recruits who did. Among entry smokers (i.e., those smoking any during the 30 days prior to RTC), 21% reported that the policy at RTC had influenced them by making them want to stay off cigarettes after graduation. Interestingly, 15% of entry smokers felt the policy had made them want to smoke even more after graduation. Almost half of entry smokers reported experiencing some withdrawal symptoms from cigarettes during training.

Table 12

Responses to additional graduation items related to the RTC no-smoking policy.

Graduation Survey Item	% responding Yes
Do you know the smoking rules for recruits?	93
Were smoking rules generally enforced?	87
Were you reminded/encouraged NOT to smoke?	63
Did you smoke during RT?	3
Did recruits sneak cigarettes?	4
Has the RT policy made you want to stay off cigarettes?	21 (smokers only) <sup>a</sup>
Has the RT policy made you want to smoke more?	15 (smokers only) <sup>a</sup>
Did you experience withdrawal symptoms?	48 (smokers only) <sup>a</sup>

<sup>a</sup> reported any smoking in the 30 days prior to entering RTC

### 5. *Smoking Status Among Women 3-Months Post-Graduation*

As described earlier, those recruits reporting any experience with smoking at entry to recruit training were sent a 3-month follow-up survey. Approximately 39% (n=1,072) of those mailed the survey (n=2,783) returned it,<sup>2</sup> a response rate that was essentially the same by condition. Examination of demographic and entry smoking variables showed that respondents and nonrespondents did not differ with regard to racial/ethnic composition or age, although nonrespondents had a slightly higher smoking rate at entry to RTC ( $\chi^2=7.49$ , df=1,  $p \leq .01$ ), and were more likely to be daily smokers ( $\chi^2=12.69$ , df=4,  $p \leq .01$ ) than respondents. In addition, education was positively related to completing the survey, such that 27% of those with less than a high school education, 39% of those with a high school education, and 45% of those with more than a high school education completed the survey ( $\chi^2=14.12$ , df=2,  $p \leq .001$ ).

Intervention effects at the 3-month follow-up are not the focus of this report, as the mailed support intervention would have received only two mailings by the time of the follow-up survey. Instead, the focus is on overall smoking relapse at the 3-month assessment across conditions, as well as examination of entry and graduation correlates of relapse. Figure 5 presents overall past-30-day smoking rates at the 3-month follow-up. Slightly over two-thirds of "smokers" had resumed smoking at 3-months following graduation, and 32% reported not smoking. The smoking rate varied considerably by the type of smoker at entry: 89% of daily smokers at entry to RTC had relapsed at the 3-month follow-up, yet only 31% of entry "experimenters" reported smoking at 3-months post-graduation. Those reporting they were occasional or former smokers at entry to RTC were smoking at the 3-month assessment in rates of 66% and 52%, respectively.

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<sup>2</sup> This response rate is likely an underestimate because some attrition from the Navy during the first 3 months would have been unknown to the research staff, and some individuals mailed a survey would have in fact, been "ineligible" by virtue of having left the Navy.

Figure 5

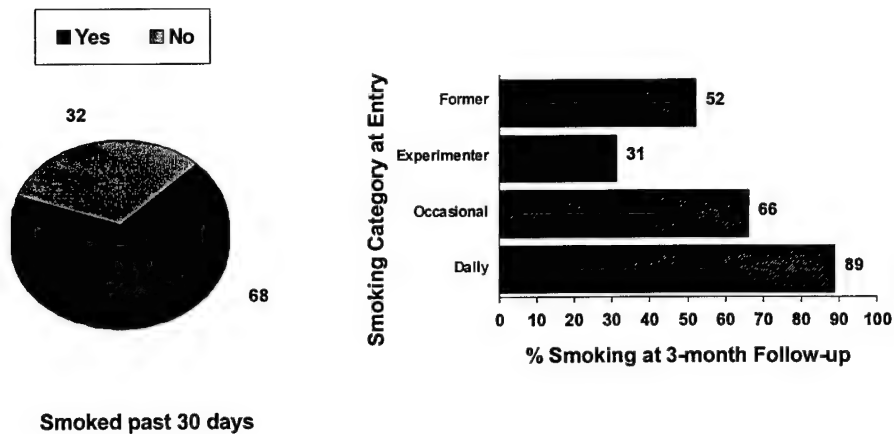
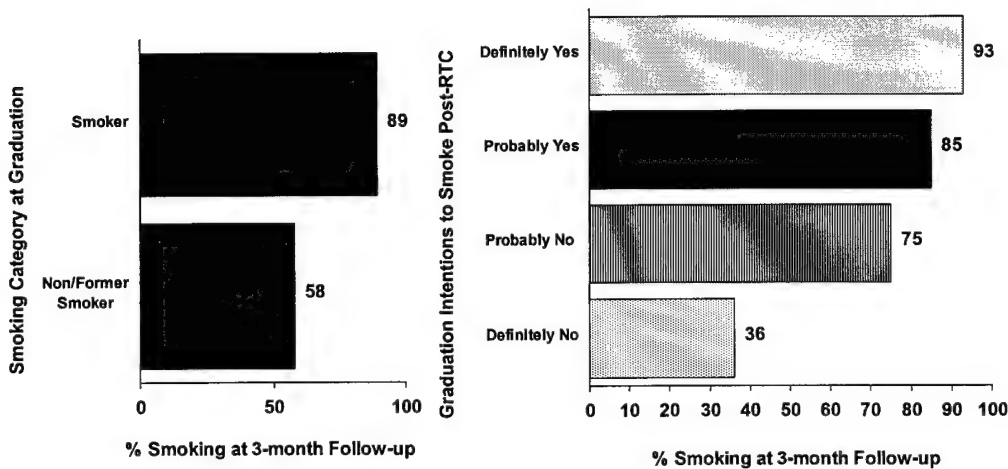
Prevalence and Entry Predictors of Smoking at 3-Month Follow-up.<sup>a</sup><sup>a</sup> Includes all recruits with any smoking experience prior to entry (n = 1,064)

Figure 6 presents variables measured at graduation as correlates of smoking at the 3-month follow-up. Those who still perceived themselves as smokers at graduation were far more likely to be smoking after leaving RTC than those reporting they were non/former smokers at graduation (89% vs 58%). In addition, intentions to smoke after leaving RTC reported at graduation were strongly associated with smoking after graduation. Of interest is the dramatic difference between the smoking rates of those definitely not intending to smoke after leaving RTC (36%) and the other three intention categories.

**Figure 6**  
Graduation Predictors of Smoking at 3-Month Follow-up.<sup>a</sup>



<sup>a</sup> Includes all recruits with any smoking experience prior to entry (n = 910)

In a related vein, Table 13 presents 3-month smoking rates by entry-to-graduation intention change groups for various categories of entry smokers. Considering those with *any smoking experience* at entry to RTC (i.e., “smokers”), consistent intentions not to smoke (i.e., both at entry and at graduation) was associated with a lower 3-month smoking rate (50%) than that seen among other intention groups, including those making a positive intention change ( $\chi^2=133.25$ ,  $df=3$ ,  $p \leq .001$ ). Considering only those who reported smoking in the 30 days prior to entering RTC, the 3-month smoking rate was still significantly lower among those consistent in their intentions not to smoke than among the other three intention groups ( $\chi^2=28.00$ ,  $df=3$ ,  $p \leq .001$ ). Considering only those who reported at entry that they were daily smokers, intention change was not related to smoking 3 months after leaving RTC. Among these more “regular smokers,” those who were consistent in their intention not to smoke after leaving RTC had as high a relapse rate at the 3-month follow-up as those consistent in their intentions to smoke, those who made a negative change, and those who made a positive change.

Table 13

Entry-to-graduation intention change and smoking at the 3-month follow-up.

Intention Change Group	% smoking at 3-month follow-up		
	"Smokers" <sup>a</sup> at Entry	Past 30-day Smokers at Entry	Daily Smokers at Entry
Consistent intention NOT to smoke after leaving RTC	50	70	89
Negative change	77	86	87
Positive change	85	78	82
Consistent intention to smoke after leaving RTC	88	88	91
Chi-Square <sup>b</sup>	133.25*	28.00*	NS

<sup>a</sup> Included recruits with any smoking experience prior to entry<sup>b</sup> Chi-Square test of differences in smoking rate by intention-change groups

\*p&lt;.001

6. *Publications, Presentations & Awards (cumulative)*

***Manuscripts***

1. A manuscript entitled "Does the US Navy attract young women who smoke?" is under review with the *American Journal of Public Health*. See Appendix A for a copy of the manuscript.
2. A manuscript entitled "Operation Stay Quit: A mail intervention to prevent smoking relapse among Navy women" is under preparation.
3. A manuscript entitled "Enhancing health survey response rates of enlisted Navy women: Implications for Reaching reluctant participants" is under preparation.
4. **The Health Psychologist, Spring 1996.** Operation Stay Quit was invited to submit an article regarding our research with Navy women. "Operation Stay Quit: Smoking relapse prevention for Navy women recruits" appears in the Spring 1996 edition (see the 1996 Annual Report for a copy of the article).
5. **Navy-wide Medical Press Release.** A press release describing the project and its overall goals was distributed through Navy MEDNEWS (see the 1996 Annual Report for a copy of the press release).

***Presentations***

1. **San Diego Biostatistics and Epidemiology Research Exchange, 1997.** An abstract entitled "Smoking in US Navy women recruits: sociodemographic correlates and comparisons with civilian women" was presented at this annual conference (see Appendix B for copy of abstract).
2. Recruit Training Command, Great Lakes Briefing 7/9/97 (see Appendix C for copy of Briefing packet).
3. **1996 American Public Health Association Annual Meeting.** An abstract entitled "Effect of an 8-week involuntary smoking ban on women's perceptions of being a smoker" was accepted for presentation at the APHA annual meeting (see the 1996 Annual Report for a copy of the abstract).

***Thesis/Dissertation***

1. *Master's Thesis.* In May, 1997, the M.P.H. degree in epidemiology was awarded to Ms. Katie Weaver (Operation Stay Quit graduate assistant). Ms. Weaver's master's thesis was entitled "Smoking in U.S. Navy women recruits: Sociodemographic correlates and comparisons with civilian women."
2. *Doctoral Dissertation.* A doctoral candidate in epidemiology will be conducting her dissertation using project data. The dissertation is entitled "Prevalence, correlates and short-term effects of involuntary cessation." Data analyses will be conducted on baseline, graduation and 3-month follow-up data.

***Awards***

1. *Augmentation Award for Science and Engineering Research Training (AASERT).* Operation Stay Quit was granted an AASERT award in the amount of \$28,796 for a two year period. This award is supporting the work and professional development of one graduate-level research assistant.

### III. Conclusions/Discussion

#### A. Interim Findings

Analyses of data collected through the end of the second year of the study have provided a great deal of interesting findings. The results presented in this report have been primarily descriptive covering changes in smoking-related behaviors and perceptions from entry to graduation from recruit training, as well as initial results on smoking at the 3-month follow-up. Because of the timing of the intervention efforts, insufficient data were available at the end of the second year of the study to assess any intervention effects.

Participation rates of the Navy women while at the RTC were exceptionally high. Over 93% of all women entering the Navy during the study's intake period completed the entry survey, and the response rate for completion of the graduation survey was 86%. Not surprisingly, the response rate at the 3-month follow-up was substantially less--39%. Yet even this response rate was higher than is typically found using mailed survey procedures (typically, 25-35%).

As reported in the 1996 annual report, over 40% of entering women recruits reported having smoked during the month prior to entering recruit training. This raised the question of whether young women entering the Navy were more likely to smoke than their civilian counterparts who do not enlist in the service. To address this issue, our smoking data on entering Navy women recruits were compared to a large sample of U.S. civilian women that was standardized to approximate the Navy sample on age, education, and race/ethnicity. Results of these analyses indicated that women entering the Navy were more likely to be smokers than their civilian counterparts. This pattern tended to hold true across age, education, and ethnic groups, with two general exceptions—smoking rates for older women (i.e., those in the 24-35-year-old age group) and black women did not tend to differ across the Navy and civilian samples.

Interesting changes in perceptions of being a smoker and expectations regarding smoking were observed over the course of recruit training. For example, considering only those women recruits who reported that they had smoked during the month prior to entering recruit training, 37% reported themselves as being former/nonsmokers just prior to graduation; yet, 60% still reported themselves as smokers even though they had not been allowed to smoke at any time during the prior eight weeks. It is noteworthy that most of the latter group were "daily" smokers when they entered the Navy, whereas, those who considered themselves nonsmokers just prior to graduation were more likely to have been experimenters, occasional, or former smokers at entry into the Navy.

In general, there was a high degree of consistency between recruit training entry and graduation in whether individuals continued to perceive themselves as smokers or non-smokers and whether they intended to smoke in the future. Nonetheless, changes in perceived smoking status and intentions to smoke after leaving the RTC tended to be related to age, education, race/ethnicity, and level of addiction. For example, fewer women with greater-than-high school education consistently reported themselves as smokers than did women with less-than-high school

education. Also, non-Hispanic Whites and Native Americans were more likely than other ethnicities to consistently perceive themselves as smokers. Younger women were more likely than older women to have consistent intentions to smoke after leaving recruit training. Baseline level of addiction also was related to changes in smoking intentions, with those who were consistent in their intention to smoke reporting that they had their first cigarette of the day earlier after awakening than did other groups.

Three-month follow-up surveys were sent to all participants who had reported any experience with smoking prior to entering the Navy. Just over two-thirds of these women reported having smoking during the past month. The type of smoker a woman reported herself to be at entry into the Navy was a strong predictor of relapse three months after leaving recruit training. For example, 89% of self-reported "daily smokers" at entry into the Navy had relapsed three months post training, whereas, only 31% of self-reported "experimenters" had relapsed at this point. Those who just prior to graduation reported that they "definitely" intended not to smoke after leaving the RTC had a relapse rate of only 36% compared to relapse rates of 75-93% for those with less firm intentions not to smoke. It is striking that even among those with the strongest intentions not to smoke after leaving the RTC, over a third had relapsed within three months.

## **B. Accomplishments and Challenges**

Progress executing this study during its second year has continued to be outstanding. All objectives and milestones for completing data collection at the RTC, implementing the post-RTC intervention efforts, conducting and completing the 3-month post-RTC follow-up, and continuing ongoing 6- and 12-month follow-up efforts have been on track. All 87 female divisions formed at RTC between mid-March 1996 and mid-March 1997 became part of this study, with a very high individual participation rate (93%). Although fewer women entered the Navy than the 8,600 predicted in the BUPERS Accession Plan for FY96, our actual sample of 5,503 women recruits is still quite sizable and can be considered truly representative of women entering the Navy during this period.

After completing the second year of this study, two issues noted at the end of the first year of the study continue to be of concern now. First, very few participants in the telephone helpline condition have called to receive the phone counseling. This has been true despite the incentive available for those who call (e.g., a phone card worth 10 free minutes of long-distance calling) and the two reminder postcards sent at 3 ½ months and 6 ½ months post RTC reminding them of the availability of the helpline and its 1-888 number. Although information from our focus groups suggested that very few women are seriously interested in quitting smoking for good immediately after leaving recruit training, we still continue to be surprised by the extent of non-interest that we have observed. We had hoped that the reminder postcards might serve as cues to call for counseling help at points when they might be more susceptible to quitting smoking (e.g., noticing the costs of cigarettes with limited incomes; feeling the effects of smoking while exercising in preparation for the required physical fitness testing). However, these cards have not generated much additional calling.

The second primary concern had to do with response rates to the post-RTC follow-up surveys, which were initially very low at the 3-month follow-up. This was not totally unexpected, as response rates for mailed surveys typically are quite low (e.g., in the 25-35% range). Furthermore, in previous Navy surveys conducted by the current investigators, we noted an inverse relationship between survey completion and several factors--i.e., those who were younger, had lower rank, and had fewer years in the service were less likely to return surveys than older, higher ranking individuals with more years in the service. We had expected a higher response rate, however, because of providing the incentive of a chance to win a \$100-monthly lottery prize.

To increase the response rates to follow-up surveys, several additional procedures were instituted. A brightly colored flyer announcing previous winners of the \$100 lottery prize is now included with all follow-up surveys. Reminder postcards to return completed surveys for a chance to win the monthly \$100 lottery are sent to all participants several days after the surveys are sent. If a participant does not return her survey within two weeks, a trained phone surveyor attempts to contact the participant and complete the survey over the telephone. If phone contact is not successful, an abbreviated "postcard" version of the survey is sent to try to get answers to a few critical smoking questions. At the final 12-month follow-up, several additional procedures have been added, including offering a free pre-paid phone card and a \$20 cash incentive to complete the survey. Lastly, one additional postcard is sent requesting that a nonrespondent call collect to complete the final survey by phone. These added procedures appear to have substantially increased the response rate, especially at the 12-month follow-up (53% response rate to date).

## IV. References

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## **V. Appendices**

- A. Manuscript - under review**
- B. SD Biostatistics and Epidemiology Research Exchange Abstract**
- C. RTC, Great Lakes Briefing Packet**

# **Appendix A**

Manuscript  
(under review)

## Does the U.S. Navy Attract Young Women Who Smoke?

Kathleen B. Weaver, MPH,<sup>1</sup> Susan I. Woodruff, MA,<sup>1,2</sup> Terry L. Conway, PhD,<sup>1,3</sup>

Christine C. Edwards, MPH,<sup>1</sup> Shu-Hong Zhu, PhD,<sup>4</sup> and John P. Elder, PhD, MPH<sup>1</sup>

Running head: Smoking among Navy Women Recruits

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Word counts:

Text: 1250

Abstract: 116

Tables: 2

Key words: smoking, military, women, tobacco use

## **Does the U.S. Navy Attract Young Women Who Smoke?**

### **Abstract**

*Objective.* The purpose of this study was to assess whether the U.S. Navy is disproportionately attracting and recruiting female smokers from the civilian sector.

*Methods.* Standardized comparisons of cigarette use among Navy women recruits and civilian women were conducted with data from a 1996-97 Department of Defense study and the 1994 National Health Interview Survey.

*Results.* Young Navy women recruits (18-22 years of age) had significantly higher rates of current and heavy smoking than their civilian counterparts after adjusting for differences in sociodemographic characteristics. Smoking rates among older recruits and civilian women (23-30 years) were not significantly different.

*Conclusions.* It appears that the Navy attracts young civilian women who already smoke, many of whom smoke heavily.

## **Does the U.S. Navy Attract Young Women Who Smoke?**

The civilian population has seen dramatic decreases in smoking rates in the last 30 years.<sup>1,2</sup> Although this decreasing trend has also been evident in the U.S. military, smoking rates remain higher among military personnel than among civilians.<sup>3,4</sup> Tobacco use is of particular concern to the U.S. Navy as it is estimated that 35% of Navy personnel are smokers compared to 25% of civilians.<sup>1,4</sup> Studies in the 1980s suggested that the military was creating smokers rather than attracting them, and that military policies and programs at the time had not been effective in reducing smoking.<sup>5-7</sup> The present study addresses the latter part of the "creating versus attracting" question and focuses on women just entering the U.S. Navy. No studies to date have been conducted that focus exclusively on military women, and no studies have compared smoking rates among new military *recruits* and civilians. This paper reports the results of standardized comparisons of cigarette use among U.S. Navy women recruits and their general population counterparts. By conducting standardized comparisons, the question of whether the Navy recruits female smokers can be answered more definitively.

## **METHODS**

### **Data Sources**

**Navy Women Recruits.** This study was part of a larger project sponsored by the Department of Defense to assess the long-term effectiveness of two smoking relapse prevention strategies for Navy women.<sup>8</sup> Data for Navy women recruits were taken from baseline surveys on tobacco use administered to all women entering basic training at the U.S. Navy Recruit Training Command at Great Lakes, Illinois during March 1996 to March 1997. Sociodemographic data were extracted from the computerized Navy Enlisted Master Record (EMR). The EMR is

maintained by the Bureau of Naval Personnel and is used in processing personnel information for all active duty Navy enlisted members.

Of the 5,894 Navy women recruits eligible for participation in the study, a total of 5,503 (93%) completed a baseline survey. Baseline surveys were matched with sociodemographic data from the EMR by social security number. Twenty-four surveys could not be matched. In addition, women who were age 17 upon entry into recruit training (n=325) were excluded from the present analysis due to incomparability with the female civilian population data. Women who were over the age of 30 were excluded because of their few numbers (n=73). Thus, 5,081 surveys (92% of the original surveys) were available for analysis.

**Civilian Women.** Civilian data were extracted from the 1994 National Health Interview Survey (NHIS). The NHIS collects health-related information on a yearly basis via face-to-face interviews with a sample from the civilian non-institutionalized population residing in the U.S. The Year 2000 Objectives Supplement to the NHIS was administered to one adult person per family in half of the households in the 1994 sample, and contains questions about tobacco use. The Year 2000 Objectives Supplement includes a total of 19,738 interviews for a response rate of 79.5%. Sociodemographic and cigarette use variables for all females between the ages of 18 and 30 were extracted from the NHIS, for a total of 2,536 cases.<sup>9</sup>

### **Standardization Procedures**

Direct standardization<sup>10</sup> was used to adjust for sociodemographic differences between the two populations. Civilian data were standardized to the joint distribution in the Navy women recruit population of race/ethnicity (White, Black, Hispanic, other) and education (less than high school, high school, more than high school).

The DESCRIPT procedure in SUDAAN<sup>11</sup> was used to handle the complex NHIS sampling design and to produce standardized estimates and standard errors for the civilian data. Unstandardized estimates for Navy women recruits were compared with unstandardized and standardized estimates for the civilian women using a difference of proportions z test.<sup>12</sup> Comparisons are reported within three age strata (18-19, 20-22, and 23-30) and for the total group. These age groupings were chosen to represent older teens, women in their early 20s, and what would be considered relatively "older women" in the context of the military recruit population. Because there were few women recruits in their mid- to late twenties, it was not possible to look at finer age groupings.

#### **Measures of Cigarette Use**

Navy and civilian women who reported smoking 100 cigarettes in their entire life and smoking in the past 30 days were classified as current smokers.<sup>4</sup> Current smokers who reported smoking 16 or more cigarettes per day were classified as heavy smokers.

#### **RESULTS**

As shown in Table 1, the Navy recruit population is younger, less educated, and somewhat more ethnically diverse, with larger percentages of African American and Hispanic women than the civilian population.

---

Insert Table 1 about here

---

Results of the comparisons of current and heavy smoking between Navy women recruits and civilian women are presented in Table 2. After standardization, the overall prevalence of

current smoking was significantly greater among Navy women recruits (36.7%) compared to civilian women (30.7%). This was also true for heavy smoking, with Navy women recruits having significantly higher rates of heavy smoking (14.6%) than civilian women (9.6%). Standardized comparisons for women 18-19 years old and those 20-22 years old were statistically significant, with Navy women recruits having higher prevalences of current and heavy smoking in both of these age strata. For women 23-30 years old, only the unstandardized comparison of heavy smoking was significant, with Navy women recruits showing a higher prevalence of heavy smoking.

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Insert Table 2 about here

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## DISCUSSION

This report provides evidence that the U.S. Navy recruits young women who already smoke prior to entering military service. This is especially apparent among young women (ages 18-22). Even after controlling for key sociodemographic characteristics, young Navy women recruits had significantly higher smoking rates than their civilian counterparts. Among older women (ages 23-30), a statistically significant difference in heavy smoking prevalence between the two populations disappeared after adjusting for sociodemographic factors.

Two limitations of the present study should be noted. First, data for Navy women recruits were collected in 1996-1997, whereas the data for civilian women were collected in 1994. However, assuming that smoking rates among women have continued to show the gradual decline observed prior to 1994,<sup>13</sup> the results of this study are conservative (i.e., the 1996-97

civilian smoking rates might actually be slightly lower than the 1994 rates used in these analyses). A second limitation is that these data sets were collected using different methods of survey administration: the Navy recruit data were collected using self-report questionnaires whereas the civilian data were collected in face-to-face interviews. These differences suggest caution in drawing conclusions from the present study.

Results from the present study indicate that the Navy is dealing with a population of women who have high smoking rates from the outset of military service. This finding underscores the need for intensified programs directed toward smoking cessation during the recruit training period. Perhaps more importantly, there is a need to create expectations among potential recruits that the Navy environment is non-smoker friendly. In 1987, the U.S. Navy instituted a 24-hour smoking ban during the entire 8-week period of recruit training, and in 1994 the Navy became a smoke-free workplace. These are important steps toward changing the Navy environment, which has historically tolerated (and perhaps promoted) smoking. However, more interventions are needed to change other aspects of Navy "culture" that may foster cigarette use. The military has a unique opportunity to make a positive impact by reducing cigarette use among its recruits and personnel. Most people who enter the military return to the civilian sector after a relatively brief period of service. Thus, decreasing smoking rates among service personnel would reduce health-related costs not only for the military, but ultimately for the civilian sector as well.

### Acknowledgments

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Table 1.—Sociodemographic Characteristics of Navy Women Recruits and Civilian Women, Age 18-30

Sociodemographic Characteristic	Civilian (n=2,536), <sup>a</sup> %	Navy (n=5,081), %
Age		
18-19	11.1	62.1
20-22	19.2	26.5
23-30	69.7	11.4
Race/Ethnicity		
White, non-Hispanic	67.0	58.2
Black, non-Hispanic	16.5	23.2
Hispanic	11.8	12.3
Other	4.7	6.3
Education		
Less than high school	15.9	5.4
High school	38.0	85.3
More than high school	46.0	9.4

<sup>a</sup>Weighted frequencies.

Civilian data source: 1994 National Health Interview Survey.

Table 2.—Comparisons of Cigarette Use among Navy Women Recruits and Civilian Women, by Age Group

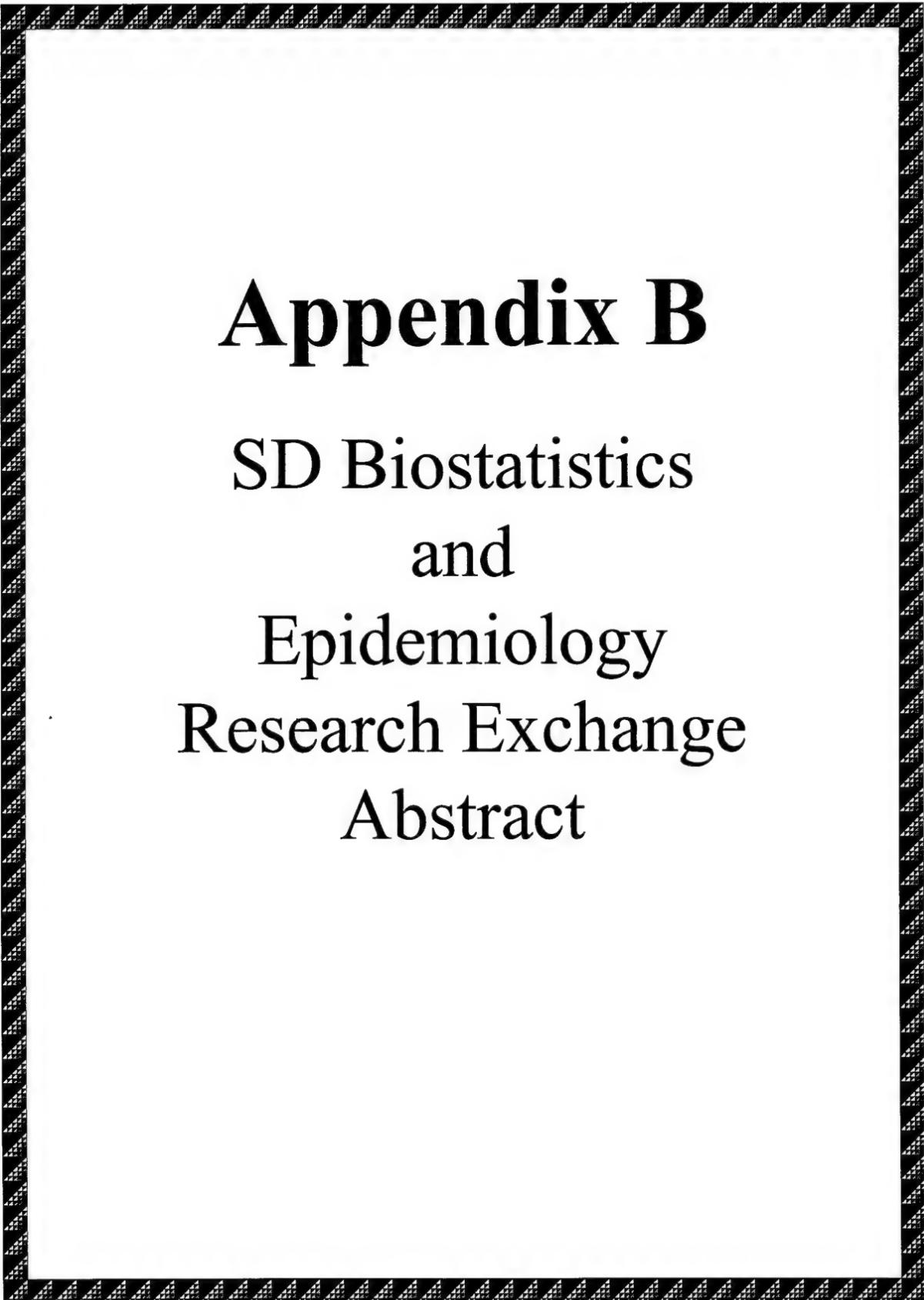
Measure	Age Group/Population									
	18-19 years			20-22 years			23-30 years			Total
	Navy	Civilian unstd	Civilian std	Navy	Civilian unstd	Civilian std	Navy	Civilian unstd	Civilian std	Navy
Current smoking	(N=3148) 35.5 (0.9)	(N=281) 18.7** (2.7)	(N=277) 16.7** (2.5)	(N=1343) 40.9 (1.3)	(N=481) 24.7** (2.4)	(N=474) 29.5** (2.8)	(N=576) 32.8 (2.0)	(N=1746) 29.6 (1.2)	(N=1725) 34.7 (1.7)	(N=5067) 36.6 (0.7)
Heavy smoking	(N=3145) 13.2 (0.6)	(N=281) 6.8** (1.7)	(N=277) 5.5** (1.6)	(N=1340) 17.9 (1.0)	(N=474) 7.6** (1.3)	(N=474) 8.3** (2.0)	(N=574) 14.5 (1.5)	(N=1744) 10.1* (0.8)	(N=1723) 11.1 (1.1)	(N=5059) 14.6 (0.5)
										(N=2508) 27.1** (1.0)
										(N=2476) 30.7** (1.4)
										(N=2506) 9.1** (0.6)
										(N=2474) 9.6** (0.8)

Note. Table entries are percentages with standard errors in parenthesis. "Civilian standardized" estimates have been standardized to the Navy distribution of education and race/ethnicity.

\*Civilian percentage significantly different from the Navy percentage at  $P < .01$ .

\*\*Civilian percentage significantly different from the Navy percentage at  $P < .001$ .

Civilian data source: 1994 National Health Interview Survey.



**Appendix B**

SD Biostatistics  
and  
Epidemiology  
Research Exchange  
Abstract

**Smoking in U.S. Navy Women Recruits: Sociodemographic Correlates and Comparisons with Civilian Women.** KB Weaver. Graduate School of Public Health, San Diego State University.

Although the prevalence of smoking has declined among both military and civilian populations since the 1980s, smoking rates continue to be higher among military personnel. The higher rate of smoking among military personnel raises concerns because of the unique physical demands of military life on which smoking has adverse affects. Smoking-related concerns may be even more pertinent for military women since there is evidence that they are especially likely to smoke and smoke heavily. The military is much different in sociodemographic composition than the general U.S. population, and such differences must be accounted for in any comparisons between the military and civilian populations. The primary aims of the present study are as follows: 1) investigate the sociodemographic factors related to smoking among women entering the U.S. Navy; and 2) compare the smoking rates between Navy women recruits and their civilian counterparts, after standardizing the civilian population to the distribution of race/ethnicity, age, and education in the Navy population. This is a methodology that has been used by previous researchers in making comparisons between military and civilian populations. Navy women recruits (n=4,259) ranged in age from 17-35 years with a mean age of 20 years. The majority of the recruits were white (58%), although Blacks comprised 23% and Hispanics comprised 13% of the recruit population. Most of the recruits had a high school education or less (91%). Among the Navy women recruits, age, education, and race/ethnicity were independent predictors of current and heavy smoking. Comparisons with civilian women showed that Navy women recruits aged 18-23 had significantly higher rates of current and heavy smoking, after standardization. No significant differences were found for women aged 24-30. It appears that the Navy is attracting young female smokers, many of whom smoke heavily. These findings have important implications for Navy health promotion policy and programs.

**San Diego Biostatistics and Epidemiology Research Exchange, 1997**

**ABSTRACT FORM**

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# **Appendix C**

RTC, Great Lakes  
Briefing Packet



# Operation Stay Quit (OSQ)

## *RTC and 3-Month Follow-up*

### *Preliminary Results*

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*Great Lakes Briefing*  
*09 July 97*

Terry L. Conway, PhD

Susan I. Woodruff, PhD (Cand.)

Christine C. Edwards, MPH

*San Diego State University*

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# Operation Stay Quit (OSQ)

## *Smoking Relapse Prevention for Navy Women\**

### *Research Investigators*

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\*Grant funded by the Defense Women's Health Research Program  
(DWHRP), U. S. Army Medical Research Acquisition Activity--DAMD17-95-5075



## Operation Stay Quit (OSQ)

### ***Problem***

- Smoking rates are high among women entering the Navy (>35%).
- Recruit Training Command (RTC) smoking ban has the potential to help some women quit.
- Most, however, start smoking again shortly after graduation from RTC.



## Operation Stay Quit (OSQ)

### ***Purpose***

**Objective:** Evaluate the effectiveness of two non-obtrusive relapse prevention strategies to help women maintain the quit status achieved at RTC.

**Research Design:** 3-group longitudinal study

**Group 1:** 1-888-helpline intervention with counselor-initiated call-back

**Group 2:** Mailed-materials intervention

**Group 3:** Control group



## Operation Stay Quit (OSQ)

### *Approach*

#### ***Participants:***

All women recruits entering RTC for a 12-month period (mid-Mar '96 - Mar '97).

#### ***RTC Surveys:***

1. "Entry" survey to assess smoking status & correlates of tobacco use.
2. "Grad" survey pre-graduation to assess impact of smoke-free RTC environment.

#### ***Post RTC:***

1. Implement phone & mail interventions.
2. Conduct 3-, 6-, & 12-month follow-up surveys.



## Operation Stay Quit (OSQ)

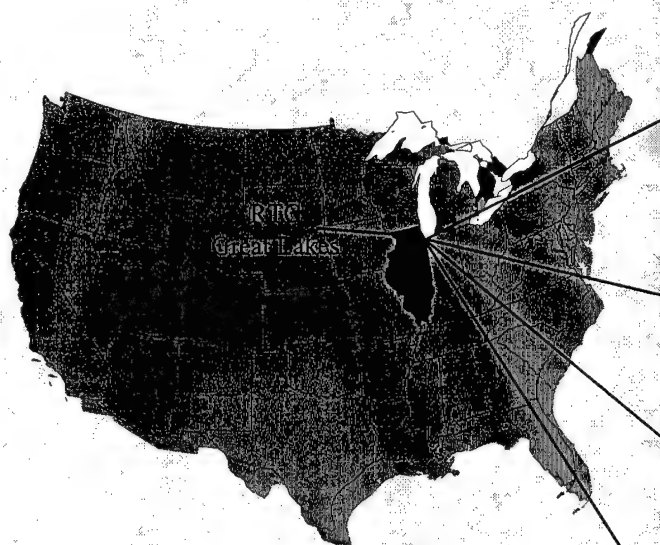
### *Progress*

#### ***Brief summary of findings to date:***

- Participation rates
- Sociodemographic characteristics of participants
- Smoking at entry to RTC and demographic correlates
- Changes in smoking status from entry to grad
- Smoking at 3-month follow-up

# RTC Study Participants Recruited

27 Mar 96 - 19 Mar 97



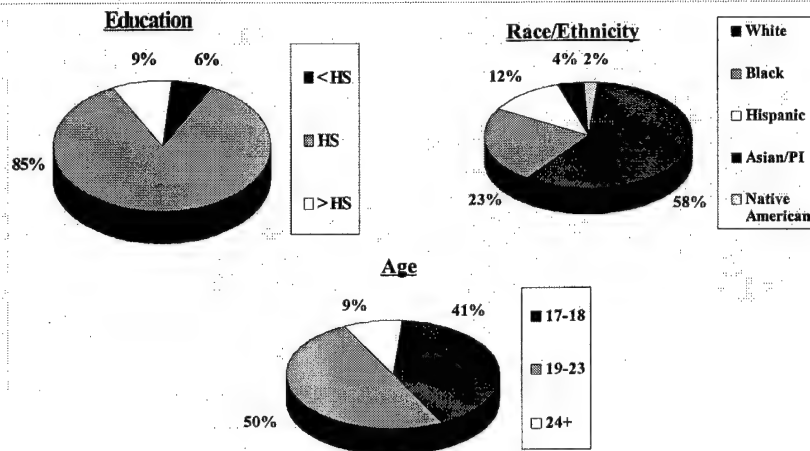
**87 Female Divisions**

**5,503 Participants**

**94% Entry  
Participation Rate**

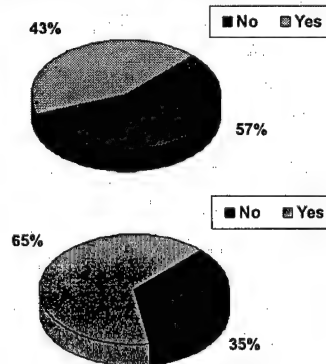
**86% Entry to Graduation  
Participation Rate**

## Sociodemographics of Navy Women Recruits



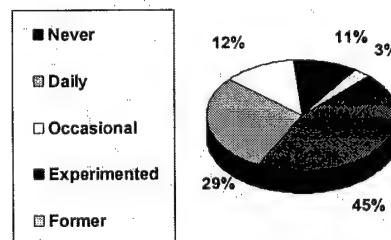
## Smoking at Entry to RTC

### Smoked 30 days prior to RTC

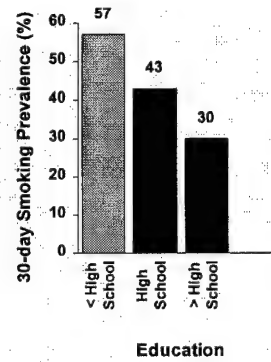
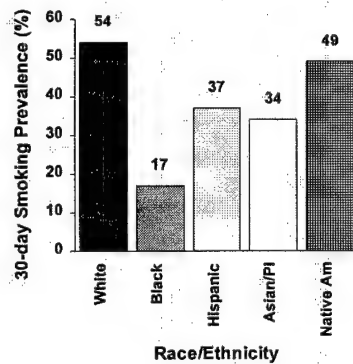


### Ever tried to quit? (smokers only)

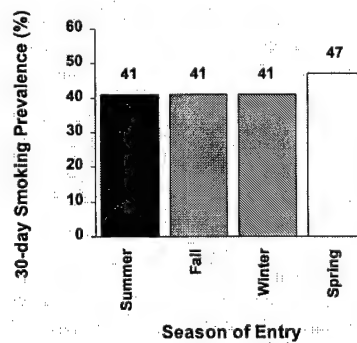
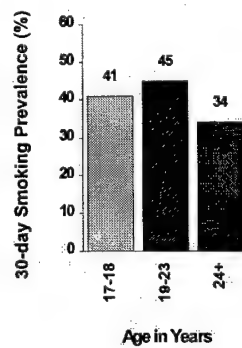
### Smoking Category



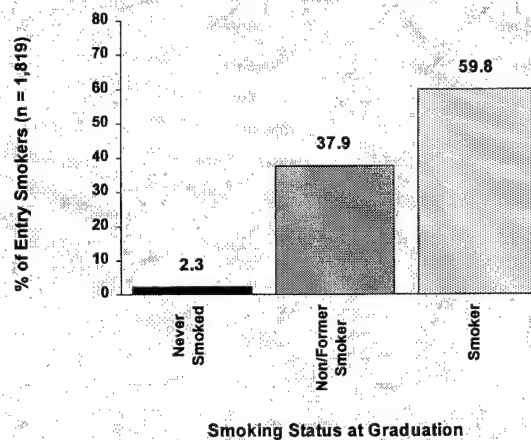
## Correlates of Smoking at Entry to RTC



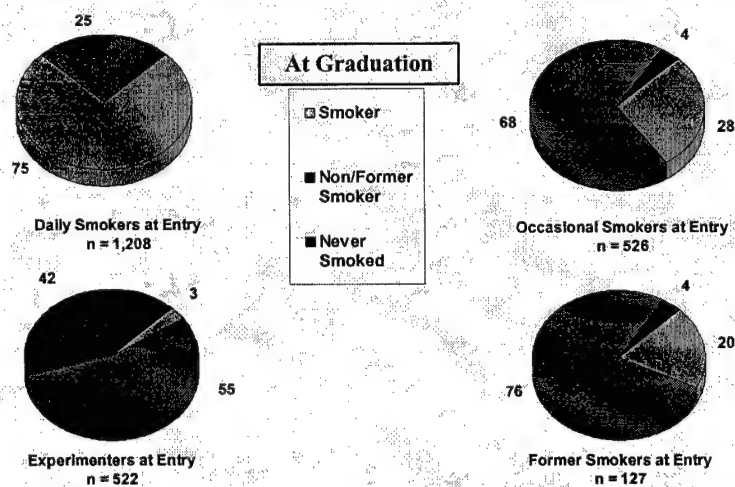
## Correlates of Smoking at Entry to RTC



## Perceived Smoking Status at Graduation Among Entry Smokers



## Perceived Smoking Status at Graduation by Entry Smoking Category



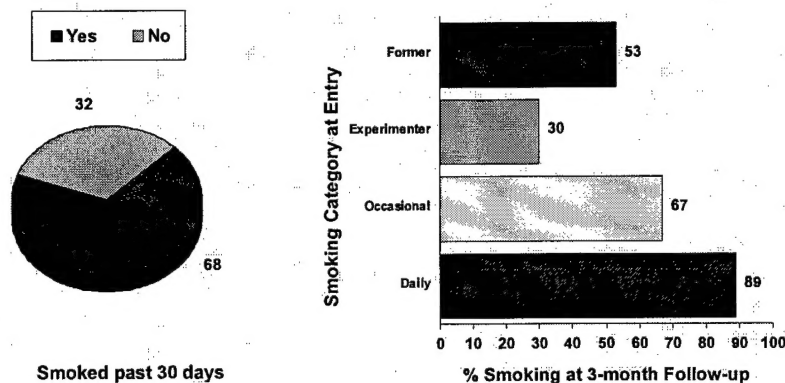
# Recruit Training Smoking Policy

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	<u>% answering Yes</u>
➤ Do you know the smoking rules for recruits?	93%
➤ Were smoking rules generally enforced?	87%
➤ Were you reminded/encouraged NOT to smoke?	63%
➤ Did you smoke during RT?	3%
➤ Did recruits sneak cigarettes?	4%
➤ Has the RT policy made you want to smoke less?	21% (smokers only)
➤ Has the RT policy made you want to smoke more?	15% (smokers only)
➤ Did you experience withdrawal symptoms?	48% (smokers only)

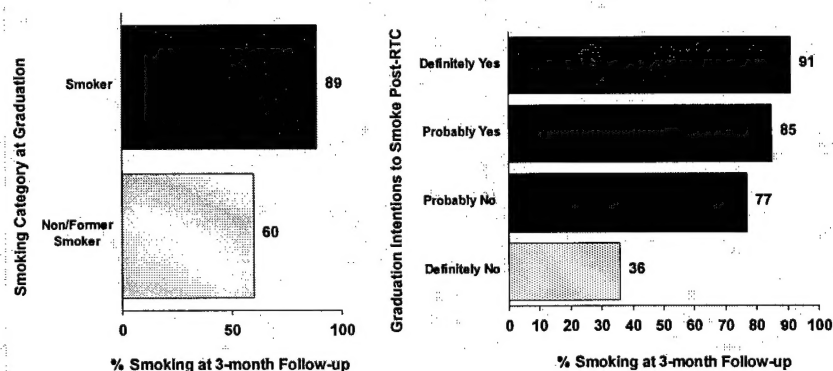
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## Entry Predictors of Smoking at 3-Month Follow-up\*



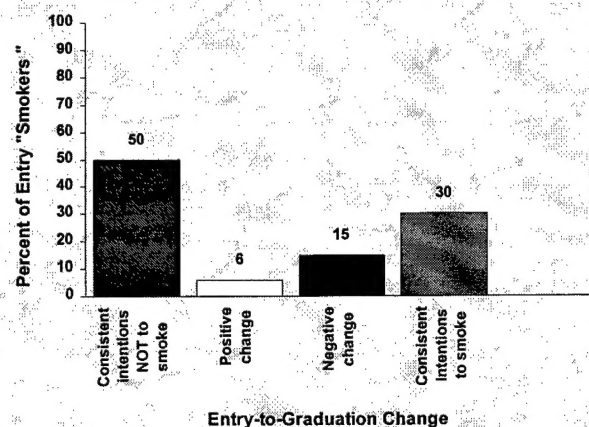
\* Includes all recruits with any smoking experience prior to entry (n = 767 )

## Graduation Predictors of Smoking at 3-Month Follow-up\*



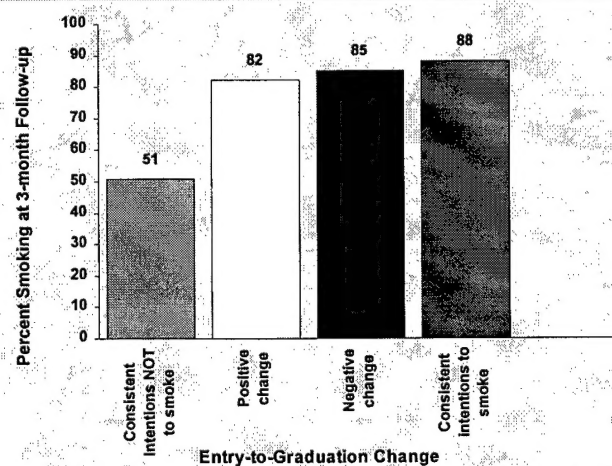
\* Includes all recruits with any smoking experience prior to entry (n = 665 )

## Entry-to-Graduation Changes in Intentions to Smoke \*



\* Includes all recruits with any smoking experience prior to entry (n = 2,364)

## Entry-to-Graduation Intention Change and Smoking at 3-Month Follow-up \*



\* Includes all recruits with any smoking experience prior to entry (n = 661)

# Estimates of Smoking Prevalence

Item	% answering Yes
<u>All Recruits at Entry</u>	
➤ Smoked 100 cigarettes in your entire life.	41.7
➤ Last time you smoked was the day you arrived at RTC to 29 before RTC (i.e., last 30 days).	40.6
➤ 30 days prior to RTC, smoked < 1 to 40+ cigarettes on typical days that you smoked.	42.5
➤ Describe yourself as an occasional or daily smoker.	40.5
<u>3-Month Follow-up of Entry "Smokers"</u>	
➤ Currently smoke?	57.9
➤ During last 30 days, smoked <1 to 40+ cigarettes on typical days you smoked.	68.4